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Editor :
SUTINDER SINGH

University of Bombay

The Oldest Young University

G.L. Abhyankar*

I

At the time this Profile is being penned, the University of Bombay is entering the 132nd year of its glorious existence. While its birth on 18th July, 1857 witnessed the passing of India from under East India Company's rule to control by British Parliament, the last decade of its century long existence witnessed the dawn of Independence and the passing away of the British Rule. The blossoming of Indian nationhood and its present strength have been the direct product of the spread of higher education. No wonder that association with this premier University has been a matter of pride for all those who have passed through its portals. The year 1988 marks the completion of 100 years since the first woman graduated from the University. The authorities are, therefore, aptly celebrating the event on the Foundation Day this year.

The University started as a purely affiliating and examining body, and though since 1919. teaching at post-graduate level was introduced, the University remains even today a predominantly affiliating University with 165 degree colleges over five districts since 1974—Greater Bombay, Thane, Raigad, Sindhudurg and Ratnagiri. It has 32 postgraduate departments. 90 recognized institutions of research and specialized studies and 48 qualified institutions of postgraduate training are also attached to it. In 1857 it started with four faculties—Arts, Law, Medicine and Engineering whereas today it has five additional faculties—Dentistry, Science, Commerce, Fine Arts and Ayurvedic medicine (including Unani and Homeopathic). The number of proposed faculties under the impending revision of the Act and Statutes is 14. Basically, however, the only significant addition over the years happens to be that of the Faculty of Fine Arts. The rest of the increase in the number of faculties has been a consequence of increasing specialization in studies and research. Arts, Science and Commerce are the most populous faculties even today, because professional education is still too expensive and time consuming to be within the reach of the common man, partly because the medium of instruction is still English, but mainly because literacy is as yet too low to influence the content and direction of higher education.

It was the curious admixture of a liberal view of state responsibilities to the populace and the day to day administrative needs of rulers that resulted in the introduction of university education in India. This characteristic of the beginnings of higher education in India, and the graceful acknowledgement of debt to western culture and thought have continued to dominate the growth and spread of university education till recently. We thus have a coexistence of two strains of policy and action: moral and constitutional responsibility of the state in the matter of education at all levels on the one hand, and reluctance of the state to get financially deeply involved, on the other. The story of the construction of University buildings at its pristine campus at Fort, Bombay, of the Convocation Hall, of Rajabai Tower, and of the development of

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**Pro-Vice-Chancellor, University of Bombay-400032.*

Kalina Campus in the sixties and later, are a testimony to the unfailing intense desire of the state to "control" educational institutions, and the equally unfailing financial timidity on the other side The establishment of the University Grants Commission has no doubt brought about a slight change in the situation, but since it is primarily a funding agency, itself dependent on the resources to be made available to it by the State, the "too little and too late" characteristic of state action has not shown any marked change.

The physical expansion of the University had to wait till the University completed its century, and the University Grants Commission made a munificent grant of Rs. 100 lakhs, enhanced by the corresponding grants of Rs 10 lakhs each from State Government and Municipal Corporation. Half of this grant had, however, to be consumed in 'purchasing marshy, undeveloped land" for its expansion and development. The academic expansion of the University till the fifties depended entirely on the munificence of Bombay citizens and their charity, and was, therefore, rather slow. After the sixties, it has depended on successive plan grants by the University Grants Commission, and the delayed matching grants by the State administration. As such, expansion has been by fits and starts. In the remaining decade or more of the twentieth century, when the universities are being saddled with more and more responsibilities, perhaps rightly so, in the direction of continuing education and extension, functional literacy, vocational training, adult education, interdisciplinary studies and research, development of science. technology and management education, and are being exhorted to act as agents of social change, and monitors and moulders of student behaviour, in an atmosphere already spoilt beyond recognition by politicians sowing the seeds of unprincipled competition, and divisive and disintegrating philosophies, the hope for mobolizing adequate resources for development leans heavily on public-spirited citizens and their untied charity.

II

Just as India is the oldest young nation in the world, the University of Bombay is the oldest young University in India. It has kept its windows and doors ever open to winds of change Its motto शीलवृत्त फल विद्या is of perennial relevance, and its principle आ नो भद्रा : क्रतवोयन्तु विश्वत : is a guarantee of its undying youth. It is situated on an island, but has never been an island unto itself in the academic world. For long years, its area of jurisdiction covered all towns from Karachi to Dharwar. The rise of new universities elsewhere coincided with the growth in numbers in the Province of Bombay itself; so that the burden of responsibilities experienced no diminution. In 1965, Goa was added to its jurisdiction; it remained with it till 1986. In 1974, four districts of Western Maharashtra were added; and unless a separate Konkan University is established, there is no likelihood of this metropolitan University being shorn of its mofussil wings. The University has therefore, to contend with dual responsibilities. It has to be true to its metropolitan character and struggle to be abreast of change; simultaneously it has to carry with it the up and coming generations from mofussil areas, struggling to join the mainstream and get away from the shackles of a poor and uncertain economy. It is functioning from two campuses. the new representing its teaching function, add the old, its affiliating and examining function. The latter perhaps has been occupying too much of its attention, energy and scant resources. However, brief notes given separately in this issue on Drought Relief Work under National Service Scheme; Mass Programme for Functional Literacy, B.Sc. Degree course in Nautical Science, and the Centre for Advanced Studies and Research in Ocean Science and Technology, the conduct of training programmes for SC ST candidates, on Western Zone Youth Festival, and the visit of Prince of Japan bear testimony to the fact that the ability and willingness to break new ground, whether in satisfying emerging social needs, or in responding to calls for implementing national programmes, continue as strong as ever. Add to this the programmes of Garware Institute of Career Education and Development, the establishment of a Numismatic Gallery, the institution of studies in Investment and Finance, the strengthening of Academic Staff College with the addition of Counselling Services and Teachers' Resource Centre, and the impending projects for Interdisciplinary Studies in International Relations financed by the Ford Foundation, U.S.A , and one will realize that the tradition of registering the first in new directions continues unbroken. All in all, the University looks forward to the Twentyfirst Century with the confidence that its alumni would be able to hold their heads high in any part of the globe at all times. ☐

University of Bombay

A FLOATING COLLEGE

TRAINING SHIP RAJENDRA

The shipping history of our country stretches over many centuries and across many eras. India is today one of the most advanced nations in the developing world in respect of the merchant marine fleet.

The need for navigating trainees for the merchant navy has been met so far by the Indian nationals trained at the T.S. 'Rajendra' specially established for the purpose in 1972 which succeeded the renowned T.S. Dufferin set up in 1927. The training imparted at T.S. 'Rajendra' turned out officers whose qualities and dedication became the envy of foreign shipping companies.

Recently. T.S. 'Rajendra' has been trying its level best to up-date training and syllabi. keeping in view the rapid technological advance and the future requirements of the country. It had been running a two-year diploma course for 250 cadets and the selection of candidates was being made through an entrance examination held on All India basis. The candidates passing the Higher Secondary School (10 + 2) examination from the science stream (with Mathematics, Physics and Chemistry) have been held eligible to appear for such entrance examination. To get actual work experience, the cadets are posted on board foreign going ships for about one and a half year's period. no sooner they complete their training. programme of 2 years and thereafter they become eligible to appear for a Certificate of Competence as Second Mate. After completing the requisite sea service, these trainees can appear for the First Mate and Master Mariner's examination conducted by the Mercantile Marine Development of the Government of India.

These arrangements were found to be incomplete and inadequate in terms of further education and training of the Mates completing their marine service. It was felt that if the curricula was restrucurted and extended by one year to qualify for the award of the degree of B.Sc. (Nautical Science) it would not only help the Mates but also give professional character and standing to the course.

The establishment of a degree course in Nautical Science would broaden the scope of further studies for brighter students who could get eligibility to pursue higher education in marine related fields especially Law, Management and Engineering.

The year 1986-87 will be inscribed in golden letters in the history of the University of Bombay, since in that year the University granted affiliation to T.S. 'Rajendra' for imparting training for the degree of B.Sc. in Nautical Science and perhaps. ours will be the first University in India to have started such a professional course in the field of mercantile marine. This is the first floating college in the country to be affiliated to any University. The first year and the second year annual examinations will be conducted by T.S. 'Rajendra' like any other affiliated college, while the annual examination for the third and final year will be held by the University.

The first examination of the first year B.Sc. in Nautical Science was held in the month of May, 1988.

Captain S.S.S. Rewari. Captain Supdt. of the Training Ship 'Rajendra' prepared the syllabus for the course with the help of a committee comprising, among others, Captain P.S. Barve and Captain S.S. Naphade, that extended active cooperation to the University in shaping the syllabus against a proper perspective. Shri Jal Coursetji was the Convener and Dr. (Smt.) Naramada Khodie, Head of the Department of Law, and a recognised guide in International Commercial Law and Practice, another member of the committee.

TO OUR READERS

Knowledgeable and perceptive as they are, our contributors must not necessarily be allowed to have the last word. It is for you, the readers, to join issues with them. Our columns are as much open to you as to our contributors. Your communications should, however, be brief and to the point.

University of Bombay

Areas Beyond India's Borders : Centres of Area Studies on USSR and Africa

With the independence of India, and even before that, the national leaders have often underlined the need and significance of enlightened awareness of the world beyond our borders. The establishment of Indian Council of World Affairs (1943), New Delhi and later Indian School of International Studies (1955) were the early steps in that direction. By the early 1960s, the University Grants Commission stepped in to further promote the discipline of "Area Studies" in Indian Universities. The University of Bombay was identified to establish, with the approval of the Government of Maharashtra, two Area Study Centres in 1971. One of the Centres was related to "Eastern Africa" and the other to "Soviet Union". The two Centres were subsequently granted independent departmental status. in the University set up, in 1983.

As departments of the University, the two Centres are expected to promote teaching courses at postgraduate level and research on socio-economic, historical and political developments as well as India's relations with USSR and African countries. Both the Centres promote interdisciplinary studies and have multidisciplinary faculty on their rolls.

Activities and Achievements

Teaching

One of the major objectives of the two Centres is to impart training to students at the postgraduate level with a view to create expertise on the respective world regions. In pursuance of this objective, the two Centres have recently introduced M.A. degree with a 4-paper course in African and Soviet Studies respectively, which can be offered by students in combination with another 4-paper course in any of the other social science disciplines such as Civics and Politics, Economics, History, Sociology, Geography, etc. The students are offered combination degree taking adequate care that their discipline orientation is not disturbed. Simultaneously they develop expertise on important world regions with whom India has all along maintained close and cordial relations.

Besides postgraduate teaching, the two Centres also register students for Ph.D. degree of Bombay University under the guidance and supervision of the Centre's faculty. Several UGC sponsored Junior Research Fellowships are available to students for their doctoral work on Africa and USSR. At present the two Centres together have on their rolls 10 research students working for their doctoral degrees.

Research

Research is by far the major activity of the two Centres. The staff members of the Centre undertake research projects on contemporary issues relating to the problems of Africa and USSR and also on India's relations with both these regions. Several research projects have been completed by the senior faculty of the two Centres, some of which are on contemporary African problems, security and development issues, India-Africa relations, Indo-Soviet trade, Super-power relations and so on. In addition to this, several short term research projects have been undertaken and completed by the faculty on topics related to political developments, economic issues and socio-historical developments in USSR and Africa.

Publications

The research output of the faculty of the two Centres has been substantial. By now they have published 12 books and over 300 research papers and articles in several academic journals and periodicals. Moreover, 5 more books are in the pipeline and are likely to be published by the faculty in the near future. The books and research papers and articles are mostly focussed on the process and the problems of developments in USSR and Africa and India's relations with these two important world regions.

Both the Centres have also been bringing out occasional papers based on research projects completed by the Faculty. Since 1985 the Centre of East African Studies has been publishing "*African Currents*"—a Newsletter of the Centre, while the Soviet Studies Centre publishes the "*Bulletin on USSR*" and "*Newsletter*" every academic term. These journals give information about the contemporary developments and analysis concerning USSR and Africa, related problems and also give information about the activities of the two Centres. The publications have been found to be useful by the academic community as well as by other interested sections of the society, including business community and policy makers. The "Bulletin" and "Newsletters" are circulated to various Universities and research institutions in the country and several other world renowned institutions outside the country.

Documentation Services

Both the Centres have acquired a sizeable collection of primary and secondary sources of materials on their respective areas over the last 15 years. The two Centres now propose to develop documentation service on a larger scale to develop these as Documentation-cum-Data Banks for the benefit of research scholars and teachers in Indian universities interested in the field of African and Soviet Studies

Seminars, Conferences, Workshops

Both the Area Studies Centres have been actively engaged in arranging from time to time national/international seminars, orientation courses, workshops, refresher courses and so on. The themes of seminars range from micro-analysis of the study of these areas—be it agriculture, urbanisation, or macro-topics covering India's relations with Africa and USSR respectively. The participants to these seminars include not only academics and area specialists but, depending on the theme of the seminar, several senior government officials, business executives and senior journalists and other eminent persons. Both the Centres have particularly taken care to invite for the seminars, refresher courses etc., teachers from the universities in Maharashtra in particular, and Western region as a whole, both as resource persons as well as participants.

Briefly, the two Centres at Bombay University have already made a country wide impact and emerged as national centres of excellence. They have received encouragement from University Grants Commission as well as Ministry of External Affairs, Government of Maharashtra and several organisations with which they have interacted from time to time. It may be particularly mentioned that in their research programmes and holding of conferences/seminars, they invariably promote active interaction with organisations such as University Grants Commission(UGC), Indian Council for Social Science Research (ICSSR), Indian Council for Cultural Relations (ICCR), Indian Council for Research on International Economic Relations (ICRIER), Indian Council for World Affairs (ICWA), Federations of Indian Chamber of Commerce and Industry (FICCI) and Indian Chambers of Commerce etc. They also collaborate with sister social science departments of the University such as Departments of Politics, Economics, History, Sociology and Geography.

With the growing importance of Africa and USSR in India's international relations, the research work and teaching programmes of the two Centres are bound to go a long way in developing India's own expertise concerning these two world areas and create a core of specialists with indo-centric perspective of the world around us. ☐

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A Weekly Chronicle of Higher Education

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University of Bombay

Centre of Advance Studies and Research in Ocean Sciences and Technology

Introduction

Oceans hold the key to the future human needs for food, minerals, energy and freshwater resources. To explore and exploit these resources, it is necessary to encourage development and establishment of required infrastructure in terms of R & D organizations, trained manpower and specialized instrumentation. The importance of scientific studies of the sea has been recognized by the Government of India, and ocean research and ocean development have been identified as one of the thrust areas. It is therefore expected that the demand for trained manpower in the areas of ocean sciences and technology will increase in future. This has become especially significant in view of the seven successful expeditions to Antartica, the recognition of India by the International Sea Bed Authority as a pioneer investor with mining rights for polymetallic modules, the exploration and exploitation being conducted for hydrocarbon resources and the Fishery Survey of India.

Oceanography is a multidisciplinary science and proper approach to teaching oceanography requires inputs from disciplines like physics. chemistry. biology. microbiology geology mathematics and engineering.

The Department of Ocean Development. Government of India, recognizing the importance of manpower development for future requirements is supporting and funding programmes at the universities and research institutions.

The teaching of marine sciences is offered only at a few maritime universities in India. mostly at the postgraduate level. Although marine biology is taught in many universities for quite some time. it is only in recent years that some universities have added teaching and research in Marine Geology, Marine Chemistry and Physical Oceanography.

Department of Ocean Development (DOD) had sponsored a workshop during 1986 to discuss the status of marine science curriculum in India in order to design a model curriculum for adoption by all the universities. The important recommendations arising out of the workshop were :

- —A core syllabus for an integrated two years Master's degree programme at the universities should be evolved.
- —Marine sciences should also be taught at the graduate and undergraduate levels as a distinct subject.
- —All organizations in the country should recognize M.Sc. (Marine Sciences) as a subject of competitive examinations and employment in the same manner as the M.Sc. for example, in physics, chemistry. zoology, etc.

In order to promote related studies, the University of Bombay has recently established a "Centre of Advance Studies and Research in Ocean Sciences and Technology" at its Kalina Campus. The Centre is presently housed in the buildings of Western Regional Instrumentation Centre (WRIC) and Life Sciences Department. It was inaugurated by Dr. S.Z. Qasim, Secretary to the Government of India on 18th February, 1988.

The University is inclined to encourage research in the disciplines like marine instrumentation, marine chemistry, marine microbiology. marine biology and marine pollution to begin with.

Acknowledging the efforts of the University, the DOD sanctioned 8 Junior Research Fellowships and 2 Research Associateships. The majority of these positions have already been filled at WRIC, Department of Chemistry, Department of Microbiololgy (St. Xavier's College). and Institute of Science. In addition the University has also encouraged faculty from its own institutions as well as those affiliated to it to undertake research programmes by submitting project proposals for direct funding from the Department of Ocean Development.

The research programmes undertaken by these institutions and coordinated by the Centre are given areawise below :

Marine Microbiology

Marine Microbiology, which used to be the Cinderella of the Marine Sciences, is now coming into prominence and being given the importance and attention it deserves.

The marine environment, both aqueous and sedimentary, represents and "inner space" in which microorganisms play a vital role, for better and for worse.

In the Department of Microbiology at St. Xavier's College, Bombay, a constituent college of the University, pioneering work, both academic and applied, on microbes from the marine environment, has been conducted over the last four decades, with very promising results. Consequently two research projects have been sanctioned by the Department of Ocean Development for investigation at this department under the guidance of Dr. Yvonne M. Freitas.

(1) The first of these projects, titled "Metabolites of Microorganisms isolated from Deep Sea Cores" aims at the isolation of microorganisms from deep sea sediments, with potential and ability to produce Antibiotics, Vitamins, Enzymes and Enzymeinhibitors of commercial importance. The organisms will be screened and promising isolates will be selected for developmental studies. The best strains will be further studied towards the utilizasion and application of their active metabolites in the pharmaceutical industry.

(2) The second project aims at the control of fish diseases which take a drastic toll of fish life, reducing the abundance of this high protein food, in the sea and in aqua-culture. To this end, the project will involve identification of fish diseases, especially in conditions of pisciculture. The causative pathogen will be isolated and characterised with respect to the fulfilment of Koch's postulates. Epidemiological studies will be conducted and prophylactic and therapeutic measures will be developed.

Alkaline Phosphatase

An application has also been made for a 3-year project entitled "Studies on Alkaline Phosphatase Production by Microorganizms from Marine Sources". The increasing use of techniques like ELISA, immunostaining and genetic engineering has emphasised the need for Alkaline Phosphatase (APase). Future developments, like enzyme involved photo-imaging, will further increase the demand for the enzyme. The marine environment, especially the bottom deposits are known for the presence of high levels of APases. Hence, this project aims at isolating APase producing microorganisms from marine sources and studying these APases, with respect to not only their industrial importance but also their environmental significance.

Sea water and sediment samples will be screened for APase producers, and enzyme synthesis will be studied in the best isolates. Various parameters will be monitored with respect to optimum enzyme production. Mutagens will be applied to obtain higher yielding mutants. Purification and characterisation of the enzyme will be followed by scale-up in a fermenter, taking into consideration conditions required for optimum synthesis of the enzyme towards large scale production.

Marine Biology and Pollution

The Zoology and Biochemistry Departments of Institute of Science, Bombay, an institution affiliated to the University of Bombay, have been involved in research, training and development in the field of ocean sciences, in particular Marine Biology, for the past five decades, which was initiated under the able leadership of late Prof. P.R. Awati and further developed by Dr. D.V. Bal. The institute has received support of the Department of Ocean Sciences for the following projects :

Zoo-Planktonic Population

Marine food chains depend upon basic trophic levels of primary producers. Primary producers of the sea are the minute phytoplanktonic organisms like diatoms, algae, etc. They determine the extent of zooplankton and other consumers which are directly or indirectly dependent on them. Planktons thus play a vital role in determining the productivity of the sea and in turn, fish catches depend upon the abundance and diversity of plankton. Thus, for evaluation of biomass productivity and other factors related to fisheries, studies on plankton are most essential. In India, especially on the Bombay coast, planktological work is done by few research scientists.

Hence, an attempt will be made under this scheme to collect the data on seasonal abundance and fluctuations along with some of the physical and chemical parameters which affect the composition and density of the plankton community of the Bombay coast, with special reference to larval forms which are commerically important. This forms the very basis of the commercially important fisheries.

Production of Glycerol

The production of glycerol through growth of marine algae, *Dunaleil* sps. is of great significance as the vast coastal area can be used for cultivation of such algae which will grow and give the necessary biomass for the production of glycerol, single cell proteins and biological pigments in this region. The economic importance of production of glycerol through marine organisms is of great significance. This information will open a new biotechnology for production of chemicals through marine environments. The effect of various pollutants can also be studied with respect to production of glycerol in brackish water.

Aquaculture

Marine fish production in India is stagnant at about 1.8 million tonnes/year but it has nearly 90,000 hectares of cultivable brackish water land which can yield nearly 3-4 million tonnes of fish for India's protein deficient hungry population. The present yield of marine fish is mainly dependent on capture fisheries but it can be increased by employing culture practices. Studies on the early development and taxonomy of various species of fishes and prawns off the west coast of India have been made so far. However, mariculture has remained neglected though successful attempts are made in culturing some inland varieties of fishes like Rohu, Catla, Mrigal and some species of prawns. To start the culture practices on a commercial basis, it is necessary to initiate preliminary experiments under controlled laboratory conditions. With this view, it was therefore, thought that acquaculture practices using shell fishes like prawns, crabs, oysters would be important. Some information on the habitat selection, spawning settlements and growth is being generated. A successful mastering of such experiments could trigger the future economic standard of the Indian fisheries.

Marine Pollution

Since pollution hazards are becoming inevitable phenomena of industrialized areas like Bombay, it has become most essential to focus attention on different aspects of pollutant-induced toxicity to biota. It is quite alarming to note that our marine waters are showing tremendous levels of toxicants like pesticides, hydrocarbons, crude oil, metallic pollutants, sewage, etc. Estuaries, creeks and coastal seas also function as receptors of such industrial and domestic wastes. When such vast array of pollutants is getting added constantly to water bodies and chiefly to marine waters, it becomes obligatory to focus our attention on adverse effects (both qualitative and quantitative) of such pollutants on marine life. Thus, studies will be carried out using biochemical and biological parameters to investigate these effects.

These studies not only help to reveal their toxic effects on biota but also to monitor the levels of pollutants which are being released into the sea.

Micro-algae

The Institute has also forwarded a major scheme entitled — "Studies on micro-algae as a non-conventional source for production of chemicals and single cell proteins" to the Department of Ocean Development, New Delhi.

Marine Instrumentation

The Western Regional Instrumentation Centre, an institution of the University, has approached Department of Ocean Development for financial support and development of marine instrumentation.

Assessment of Freshness of Fishes

The assessment of freshness of fish has remained much of an art than science so far and for majority of consumers, it has remained a matter of experience. A lot of work has been done in the west in assessing the freshness of catch mainly of those species which are popular in European countries. Very little work has been done on the species which are generally found in Indian waters and relished by Indian populace. It is therefore important to develop a scientific basis to assess the freshness of these fishes. A proposal to develop an electronic instrument which will assess the various decay parameters in the body of a fish, has been made to the Department of Ocean Development and has been approved for support. The work in this area is under way.

Ocean Parameter Studies

The Centre has also proposed a major project for development of microprocessor based instrumentation for ocean parameter studies. It has been recognized that the biological and other resources of the ocean depend, to a very large extent, on physical and chemical parameters of the ocean which sustains them. It is, therefore, necessary to undertake detailed study of each of them for making proper research assessment of the economic zones assigned to the country. The proposal therefore aims at developing an automated microprocessor controlled measurement of the important parameters such as pH, salinity, dissolved oxygen (DO), Oxidation Reduction Potential (ORP), turbidity, and water temperature as a function of ocean depth. The instrument under design is capable of taking measurements up to the depth of 200 mts. and can be taken to the site of measurement by a semi-skilled operator in a mechanized boat. This would permit continuous monitoring of water parameters of the ocean over a large area through use of a few thousand mechanised boats which are now used by fishermen of Indian coastline.

Marine Chemistry

The Department of Chemistry of the University is also involved in research related to chemistry of marine environment and its application in areas such as drugs. Some of the projects approved by the Department of Ocean Development are given below :

Chemicals from the Sea

In order to successfully exploit the ocean's wealth by way of recovering chemicals and materials from the sea, vigorous research and developmental activity is essential in addition to the consideration of economic, political, legal and ecological factors. Work is proposed to be directed towards various types of chemical and material resources such as the following :

(a) from sea water — fresh water (desalination and distillation) magnesium and magnesium salts hydrothermal brines salts such as bromides, iodides

(b) from the sea floor — Metal rich sediments, ferromanganese nodules, phosphorite nodules, construction materials placer and beach deposits

(c) from beneath the sea floor — Sulphur, coal, hydrocarbons

Efforts will be directed towards developing appropriate physico-chemical techniques of concentration and separation suitable for recovery and conversion to useful form of resources from among the above mentioned materials.

Drugs from the Sea

Recent developments in marine pharmacology involving extraction and identification of substances from marine organisms, useful primarily for medical purposes, have opened up profitable area of investigation for obtaining vitamins and drugs from the sea.

The project will include extraction of such potentially useful medicinals/crude organics from marine organisms, both of plant and animal kingdoms and studying their physical and chemical properties and screening their physiological activities. Studies will also be directed towards purifying the drugs and exploring their suitable formulations. The medicinal substances obtained in this manner are found to possess diverse curative and preventive properties such as cardiovascular, antifertility, hypertensive, diuretic, hypotensive, antiviral, steroidal activity.

As a long-term prospect of developing this activity intensively in the University, it is proposed to approach the University Grants Commission for establishing a postgraduate department of Ocean Sciences with funds from the Commission. □

University of Bombay

Western Regional Instrumentation Centre

Introduction

The importance of close cooperation between universities, industries and national laboratories has been recognized in the context of industrial development since independence. The initiative in this direction was taken in early seventies by National Committee on Science and Technology (NCST) and the University Grants Commission (UGC) by framing a suitable action plan at various levels. A bi-national conference was arranged, in 1973 at Srinagar, by the UGC, aimed at identifying areas and modalities of collaboration between universities and the others. The conference concluded, on closer examination of conditions then prevailing in the universities, that they were then lacking minimal technological infrastructure required for such collaboration. It was therefore, decided to introduce this important element in the general infrastructure of the universities on priority basis and the Commission contributed towards it by establishing a number of University Science Instrumentation Centres (USICs). The USICs were set up in 56 universities in the country and two Regional Instrumentation Centres (RICs), one at Bombay and another at Bangalore, were established as resource centres to support the USICs.

The Western Regional Instrumentation Centre, Bombay, was established in 1977. In a detailed survey of state of instrumentation, availability of manpower, and possible modalities of spreading the culture of instrumentation in the universities through training, maintenance, and Research and Development were examined. The Feasibility Report was approved by the Commission and was taken as a basis for programmes of the Centre since its establishment.

Objectives

The overall thrust of its activities has been to support the UGC's efforts in creating adequately self supporting infrastructure in most of the universities by the end of the VIth Five Year Plan. The long-term objective frame of the Centre, as defined by the Commission is as follows :

1. To train resource personnel with a view to generating technical cadre in USICs and colleges under the universities.
2. To provide servicing and maintenance facilities to sophisticated instruments.
3. To design and develop new teaching aids with the help of teachers of ULP and COSIP and others and work out mechanism for their dispersal in higher education system.
4. To transform the latest developments in instrumentation in research laboratories and other institutions in the country so as to make them suitable for use in the higher education system.
5. To conduct R and D programmes in instrumentation of interest to the higher education system and to the other sectors such as industry, research laboratories, etc.
6. To interact with industry, research laboratories and other sections of the society in the interest of development and growth of science and technology of instrumentation.
7. To provide updated technical information to produce source material for training and to disseminate information of the latest developments in instrumentation to the universities and colleges.
8. To render analytical services on sophisticated equipments to the universities.

These objectives have been translated into a specific action programme given below. The activities included in the programme, viz., training of personnel, development of advanced instruments, instruments maintenance and information dissemination, are complementary to each other in achieving maximum impact and form an integrated strategy. Interwoven in this strategy, though not explicitly stated, is the Centre's role as a resource centre for the USICs and as a USIC for the University of Bombay and SNDT Women's University.

Training Programmes

The main aim of the training programmes conducted by the Centre is to improve the technological competence of teaching and non-teaching staff in universities, colleges and USICs. Towards this, the Centre has been conducting a number of short-term courses on instrumentation and related subjects as one of its major activities. So far, 36 short-term courses have been conducted, covering more than 850 participants. The overall response to training programmes from the institutions sending their personnel is found to be encouraging. One of the reasons for this is that the areas of training are chosen after assessing the needs of the trainees in the environment in which they are working.

An important limitation happens to be the non-availability of competent staff who could cover wide range of instrumentation used in various branches of science and technology. The efforts of the Centre to get well-qualified staff at the officers' level have not borne fruit so far due to paucity of such people. The Centre proposes to undertake a major doctoral programme for inducting fresh manpower for its future programmes. In the recent past, it has tried to involve professional bodies, such as Indian Chemical Society. National Society for Application of Radio Activity for Industry. Academy for Environmental Education. and various departments of the University to enhance its teaching manpower for courses.

Short-term courses in general have their advantages as well as shortcomings as regards the development of manpower in the university system. In view of the fact that there is a severe paucity of appropriate type of manpower in the area of instrumentation in the academic institutions as well as in the industry, it may be necessary to have courses of longer duration oriented specifically towards aspects of instrumentation such as maintenance. This coincides with the current thinking of the UGC and Department of Electronics in this area and the Centre therefore plans to launch a one-year post B.Sc. diploma in instrumentation. It is also proposed to have this in modular form with each module of shorter duration, for the convenience of the USIC and industry staff who may not be available for an extended period. Figure 1 shows at a glance the training programmes so far conducted.

Development & Fabrication of Teaching Aids/ Laboratory Instruments

Teaching aids require not so much of high technology, as clear understanding of the way concepts are to be visualized using them. In view of their importance in science education and also their contribution in building up instrumentation and technology culture in the higher education system, the Centre consciously adopted a programme of teaching aids development. The programme was supplemented by the development of low cost versions of laboratory instruments for various science disciplines. These often formed part of the WRIC courses as projects. The Centre undertook fabrication of the instruments developed, because this way they could become available for use, readily and cheaply, to interested teachers.

Response to the teaching aid development programme has been particularly good in areas such as psychology in which the teaching community took keen interest in the programme. A major psychology teaching aid-cum-research instrument developed by this Centre has gained nationwide acceptance. Fig. 2 gives a summary of the work done.

Maintenance of Instruments

As an essential component of our activities aimed at spreading the culture of instrumentation, the Centre has been providing facilities for maintenance of instruments for educational institutions as well as to research organizations in the region. Most of the colleges in the Bombay University region have been fully utilising these facilities and overall incidences of instruments remaining idle for want of repairs has appreciably reduced (Figures 3 & 4).

This service has been conducted mainly on promotional basis so as to help the colleges in keeping their instruments working and the Centre has charged them nominally for components and overheads. The Centre has serviced instruments costing about Rs. 40 lakhs during this period. Whether such type of concessional charging be continued after having brought the teachers of the colleges to a high level of awareness in instrumentation, is a question that needs to be carefully studied in the context of financing this programme. The recovery from even these nominal maintenance charges exceeds Rs. 66,000/-.

Extending the clientele beyond the Bombay region has proved logistically difficult. Nonetheless, it is worth mentioning that the Centre conducted two Maintenance Camps in conjunction with the Training

Programmes it arranged at Panvel, a mofussil town in the Bombay University area and at Panaji, Goa. Also institutions from district places within the Bombay University areas and in the state of Maharashtra have often taken advantage of Centre's service. These facts point to a possible extension of services to mofussil areas and to the whole region.

Also enlargement of the present clientele may possibly be done by inviting medical colleges and other instrument-using institutions as well as local industries to take advantages of this facility. Attempts already made in this direction are encouraging.

Information Dissemination

It was recognized from the beginning that spreading the instrumentation culture would require an effective means of communication between members of the USICs, RICs, colleges and university departments. The Centre therefore ran a bimonthly. "Instrumentation Newsletter" between 1978 and 1980. This evolved into the 'Instrumentation Bulletin', a quarterly of fairly high standard published since 1981. Except for periods during 1982-83 when there were uncertainties regarding its funding, the Bulletin has come out regularly until the end of 1986 when primarily for infrastructural difficulties the publication had to be suspended. Until then 13 issues were published. These included two special issues, one on the occasion of the Asian Instrumentation Workshop held at Bangalore in April 1981 and the other in commemoration of late Professor B.N. Bhattacharya, Founder-Director, RSIC, I.I.T., Bombay. Received well by all readers. 2500 copies of the Bulletin were sent free of cost to all science, technical, engineering and medical colleges in the country, to all USICs, RICs and universities, to all national laboratories and other research institutions in the private and public sector and to many industries.

The Documentation Section of the Centre runs an information bank on instruments. Information about use, specifications, manufacturers and availability of instruments and components is collected and distributed to needy institutions. Also an abstract service is provided to USICs and universities by means of a quarterly Abstract Bulletin incorporating abstracts from reputed journals on instrumentation. So far three issues of this bulletin have been brought out.

Research & Development

The objective frame of the Centre includes research and development in instrumentation. In the past this was not a separately organized activity. So a number of instruments developed by the Centre were reported under the Teaching Aids Development Section. Major among these is the **PSYCHRON**, a human reaction time measuring instrument designed as a teaching aid-cum-research tool in applied psychology and already installed in more than 15 major universities and institutions in the country.

Another major instrument developed by the Centre is the **Fine Particle Analyser** which measures particle sizes between 0.5 and 100 microns. The instrument will find use in industries such as paints, dyes, pharmaceuticals, cement and ceramic and in industrial and R & D substituting expensive imported equipment. It is awaiting technology transfer.

The optical shop has designed a number of optical components and subsystems. Main among them are Nicol and Wollaston (polarizing) prisms, single direct vision prism, Lens-system for Laser-Raman Spectrometer, Czerny-Turner monochromator, etc. (Figure 5).

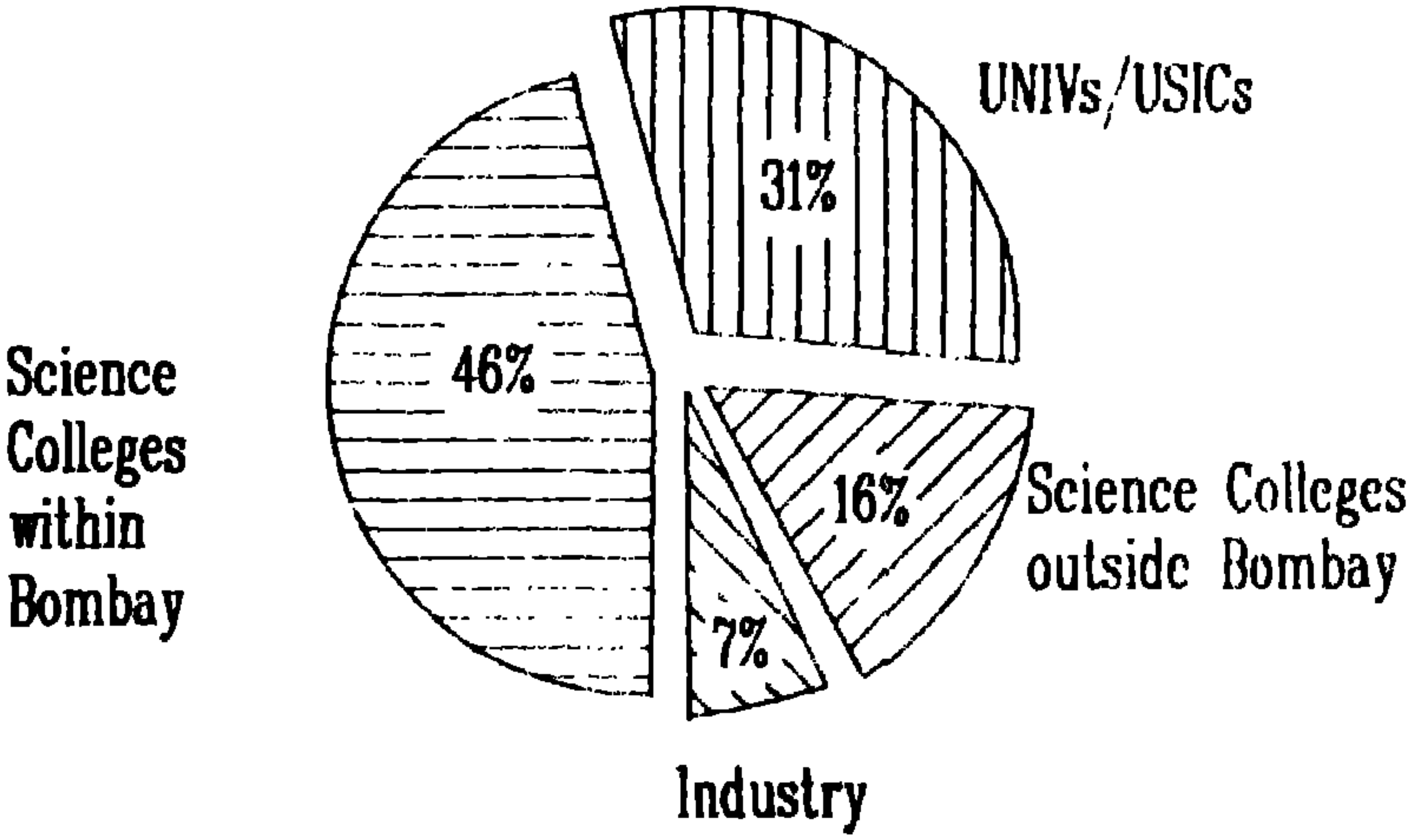
The Centre has now separate R & D Division. Many of the projects have been carried out by M. Phil (Physics) students under the guidance of the Centre's staff. The hospitals and medical community on the one hand and industries on the other have been coming forward to design and build instruments in collaboration with the Centre.

RIC-USIC Interaction

The staff of the University Science Instrumentation Centres established in different universities is regularly represented in WRIC courses. Similarly, from the point of view of extending the benefit of its activities to the region, WRIC held some of its courses along with maintenance camps at different locations in the western region. This has resulted in close interaction between the two types of institutions. To crystallize this process further, WRIC conducted one all India meeting of the USIC Heads in 1984 and three regional meetings since then. Also the USICs continually seek WRIC's help regarding information about instruments, handbooks and specialized literature, technical matters pertaining to maintenance, fabrication, development and courses and so on. The Instrumentation Bulletin, the quarterly run by WRIC served as an effective communication channel among the USICs and the RICs and also for them (*Figures are given on subsequent pages*).

TRAINING PROGRAMMES AT A GLANCE

No. of Courses conducted	36
No. of Participants	937
No. of Participant Days	10360
No. of Participants from USICS	288
No. of Participants from outside Bombay	442
No. of Participants from Industries/Research Institutions	68



No. of USICs,UNIVs,Institutions served : 43

Fig. 1

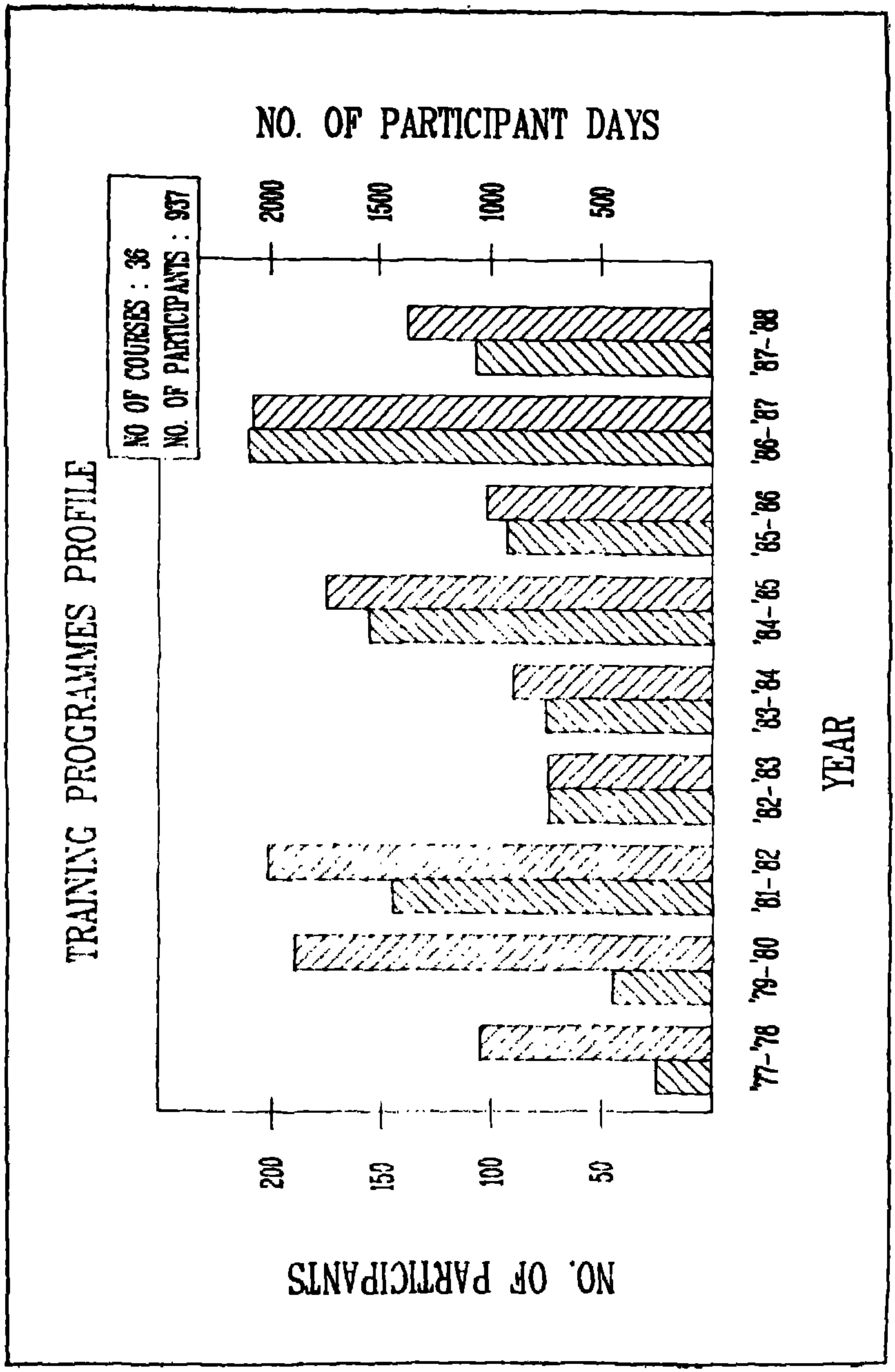

TRAINING PROGRAMMES PROFILE
NO OF COURSES : 36
NO. OF PARTICIPANTS : 937
NO. OF PARTICIPANT DAYS
2000
1500
1000
500
NO. OF PARTICIPANTS
200
150
100
50
'77-'78
'79-'80
'81-'82
'82-'83
'83-'84
'84-'85
'85-'86
'86-'87
'87-'88
YEAR

Fig. 2

MAINTENANCE AT A GLANCE

No. of Electronic/Analytical Instruments repaired	: 556
No. of Optical Instruments repaired	: 140
No. of Maintenance Camps held	: 2
No. of Institutions served	: 63

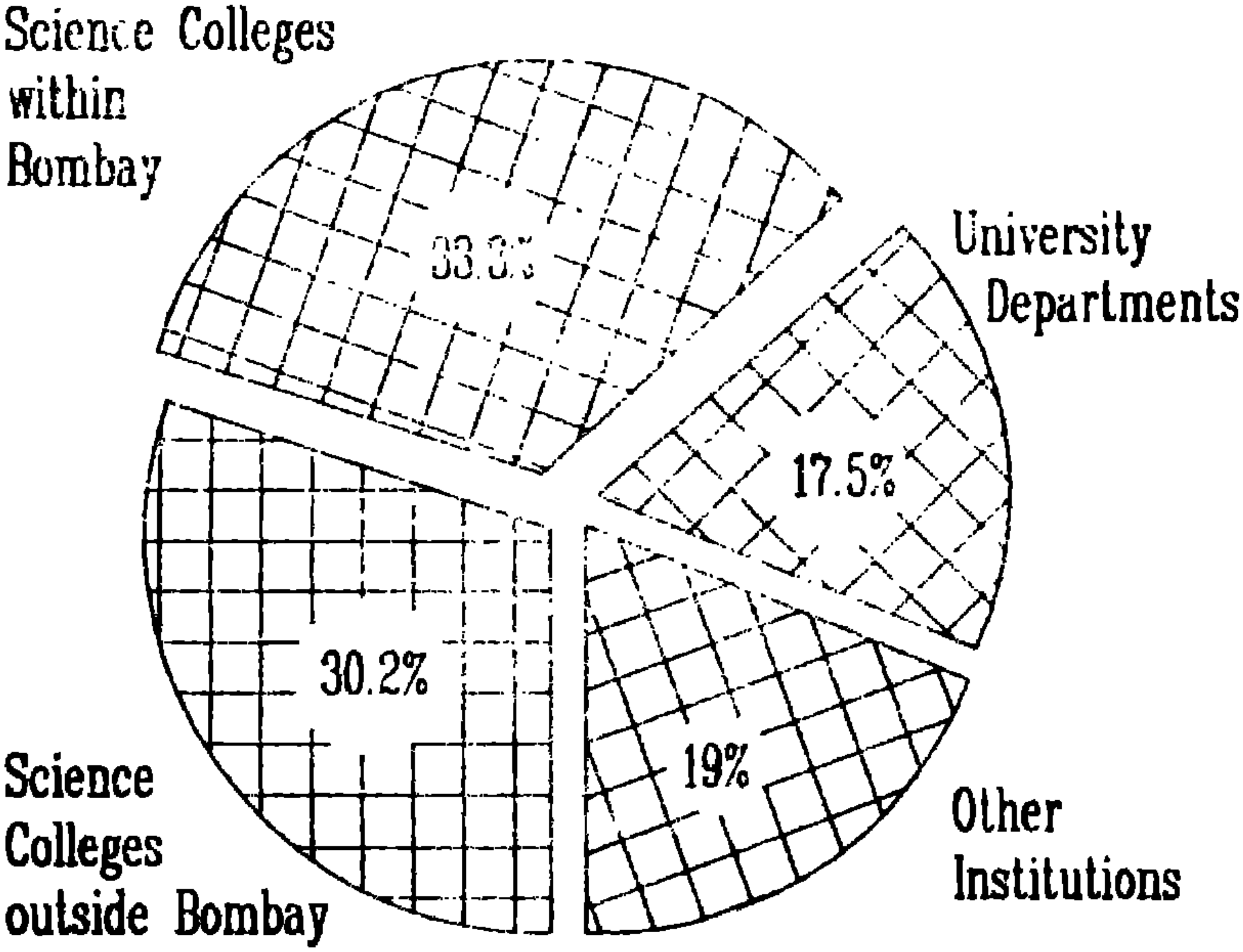


Fig. 3

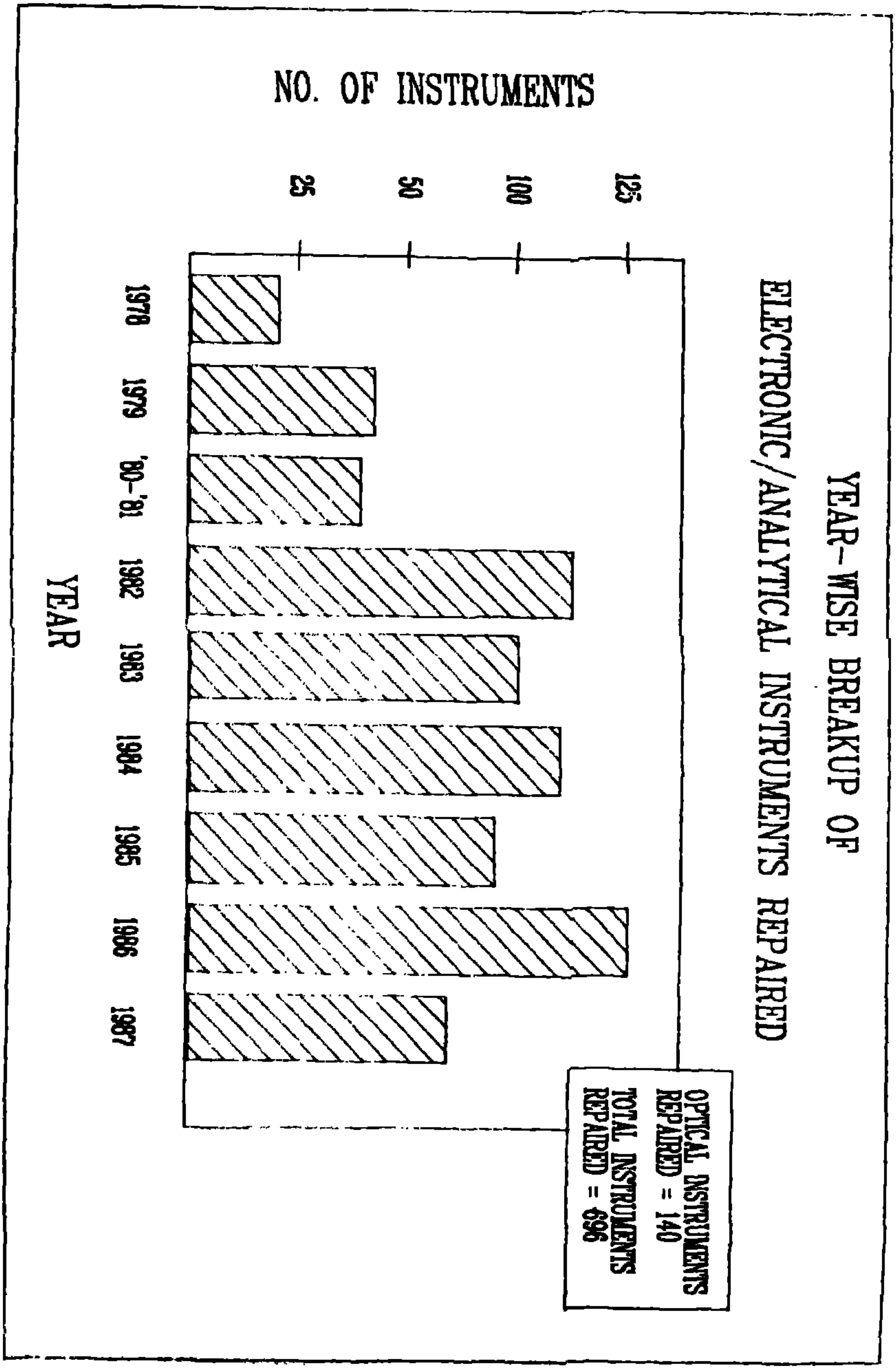
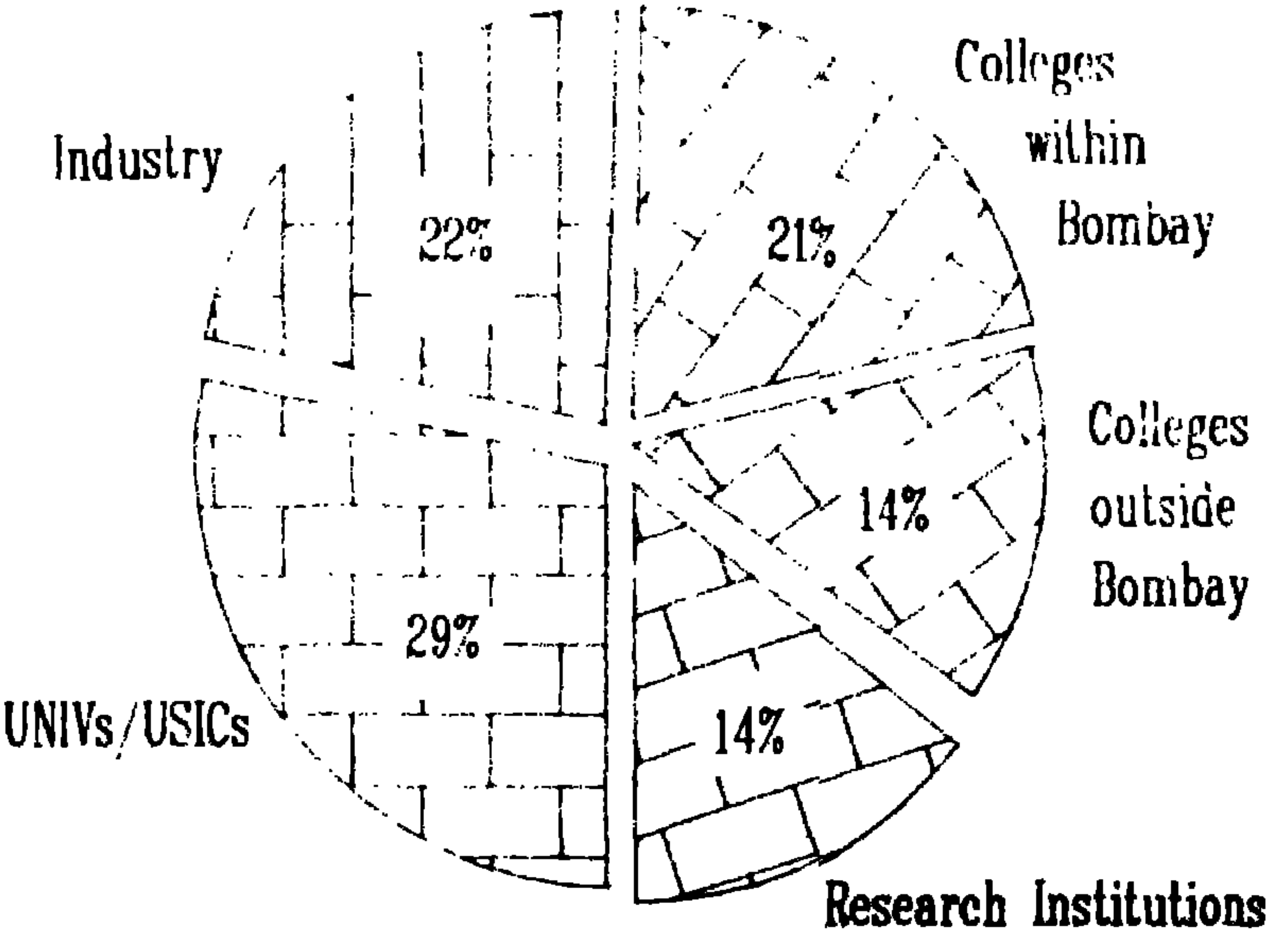

YEAR-WISE BREAKUP OF
ELECTRONIC/ANALYTICAL INSTRUMENTS REPAIRED
NO. OF INSTRUMENTS
25
50
100
125
1978
1979
'80-'81
1982
1983
1984
1985
1986
1987
YEAR
OPTICAL INSTRUMENTS REPAIRED = 140
TOTAL INSTRUMENTS REPAIRED = 696

Fig. 4

DEVELOPMENT/FABRICATION AT A GLANCE

No. of Instruments Developed	: 72
No. of Optical Components/ Subsystems Developed	: 28
No. of Instruments Fabricated	: 390
No. of Instruments Supplied to Institutions	: 305
No. of Optical Components Fabricated	: 550
No. of Optical Components Supplied to Institutions	: 540



No. of Institutions Served : 86

Fig. 5

University of Bombay

NATIONAL SERVICE SCHEME

Though officially begun in 1969, the NSS activities in the Bombay University really took off in 1972, when the University launched its programme of constructing twentyfive community wells in the tribal areas of Dahanu Taluka to mark the completion of twenty five years of Independence. Since then the University NSS Unit has streamlined its entire working, what with publication of a Manual for Programme Officers and introduction of Work Diary for volunteers, and encouraged academically oriented community service programmes in all directions. The programmes which have now become "normal" are as follows :

(1) Educational Project to provide assistance to school going children of Class IV employees of the University and Colleges.

(2) Functional Literacy.

(3) Children's Programmes for slum dwellers.

(4) Anti-dowry awakening and group marriage ceremonies.

(5) Anti-drug-addiction : preventive and curative measures.

(6) Health and Hygiene in mofussil areas.

(7) Mass-immunization; Leprosy eradication; T.B. Control.

The fresh entrants are given regular and experiential orientation, while evaluation sessions are held to help planning for the year.

The NSS Volunteers have been at the forefront in the relief measures during national calamities. In 1971, the contingent of University students did an excellent job at the Mana Camp in Orissa. Recently, during 1987-88, the volunteers took the lead in streamlining the work of the drought relief camps at Jawhar, Mokhade and Shahpur Talukas of Thane District. 14 Colleges helped in the distribution of water with the help of tankers, supervised functioning of fair price shops and assisted in implementation of the Employment Guarantee Scheme, and deepened the lakes by removing silt. Under the 'Food for Foodless' project, around 24 tons of foodgrains were distributed to 1,232 beneficiaries identified in Jawhar area. The starvation and hunger experienced by those 'have nots' could be felt by the NSS volunteers.

The popularity of NSS programmes is reflected in the fact that whereas the sanctioned strength is 15,700, the applicants numbered 28,000 in 1987.

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2. **Scientific Officer** for Solid State and Structural Chemistry Unit (DST-IRHPA Programme) (IA/308/24/88).

Essential : Ph.D. in Physics or Chemistry. 3 years (approx.) post-doctoral experience in solid state physics or chemistry and expertise in setting up facilities for measurement of electrical transport and magnetic properties.

Desirable : Knowledge of computer interface with equipment; cryogenics

3. **Scientific Officer** for Instrumentation and Services Unit (X-Ray Diffractometer) (IA/308/26/88).

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Participation in Higher Education

S. M. Israney*

Introduction

Particiption rate is the proportion of the population that takes advantage of some form of higher education. In a developing country like India, with the acceleration in the pace of economic development, demand for learning needs has been increasing. This is clearly indicated in the following statistics.

	1951	1984-85
No. of recognised institutions	2,31.000	7,55,000
Total enrolment	24 million	132 million
National stock of educated manpower	3.8 million	48 million
The enrolment for postgraduate studies	20,000	3,00,000
The enrolment in Science subjects	4,400	73,000
The annual non-plan expenditure on education	Rs. 114 crores	6000 crores
Enrolment in Secondary and Higher secondary levels	10 million (1979-80)	17 million
Enrolment in Higher Education	2.5 million (1979-80)	3.5 million (1985-86)

(**Source:** 7th Five Year Plan—1985-90, Vol. II p. 252-53)

During the 1950s, educators realised that there would be a very large pool of potential college students during 1960s and 1970s. The reason for this was demographic : the 'babyboom'. In addition to demographic statistics, data showed that the percentage of population attending college had been constantly increasing in normal times. It was predicted that this trend would continue and, when coupled with the increase in the youth population, would bring unprecedented expansion in the demands for college attendance.

Although college enrolments did increase dramatically during 1979-86, there is considerable variance among the states in the percentage of population attending college. States like Maharashtra, Gujarat, West Bengal and Madras have comparatively a bigger share of such enrolment.

Low Participation

But the percentage of increase in participation has however been much lower as compared to the percentage of non-participation to the total of population capable of participating in higher education. There are several significant policy implications attached to the phenomenon of low participation. Those states with a lower participation rate may attempt to offset projected decline in enrolment by developing policies aimed at increasing the rate of participation in higher education. Low participation is important for other reasons also. It suggests the presence of barriers to educational opportunity that prevent participation by citizens who want and should have an opportunity for higher education. Historically, funding for higher education in both the public and private sectors has been related to the number of students in attendance, and therefore, from the view point of college administrators, low participation affects resource availability. Moreover, a low participation rate may effect the economic and social wellbeing of a state because it results in an insufficiently educated labour force that is poorly positioned to respond to emerging economic and social conditions and the growing challenges of high technology.

Aspects of Participation in Higher Education

There are atleast four important aspects of participation in higher education.

(a) *Demographic Aspects*

This aspect focuses on the demographic characteristics of a given population and uses these characteristics to predict some level of participation. Between 1960s and 1970s, large increases in enrolment were predicted because of the high birth rate. There are also other demographic characteristics that have the potential for affecting participation in any given state. One would be the rate of population growth or decline as affected by immigration. Another is the age composition, i.e. movement of a state's population toward middle age.

However, demographic theory and data only describe the potential for enrolment or participation, not the actual participation. There are many unknown factors that bear up on enrolments—for example, economic conditions, federal policies, inflation, state

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**Reader, Economics of Education, Department of Economics, University of Bombay, Bombay-400098* appropriations, and complex social conditions such as the presures on the community or the civil rights or women's movement.

(b) *Economic Aspects*

The second aspect of participation in higher education focuses on the likelihood of enrolment from an economic point of view by considering life choices available to an individual and their potential costs and benefits and the societal investment of resources in higher education based on the perception of social returns on the investment. This is the so-called "human capital" point of view.

The fundamental economic assumption related to an individual's assessment of the rate of return of an educational decision is essentially a sample application of demand theory. It assumes that more education will be purchased at lower prices than what can be purchased at higher prices. Educational demand theory reflects both supply-and-demand assumptions. One assumption views the decision to enrol in an institution as an investment decision, and the other sees it as a current consumption decision.

The investment approach assumes that an individual will purchase a college education if the present value of expected social and economic benefits resulting from the education exceeds the present cost of education. The expected benefits include the additional lifetime income and the social and intellectual rewards a person might expect to receive.

The cost of a college education must be veiwed comprehensively. It includes direct money outlays in the form of tuition and fees, books, differential living costs, and other outlays incidental to going to college. Enrolment also entails indirect financial burdens in the form of opportunity costs, both private and social. Finally, there are non-monetary costs that include such things as the burden of study and, for some students, the pain of being away from home. An individual facing an enrolment decision according to this version of economic behaviour, presumably makes a decision in the light of expected benefits and costs involved in enrolment.

In the consumption approach, educational services have an immediate value that includes social, intellectual, and athletic activities. Educational demand theory is based on the concept that education confers costs and benefits on the individual and that their relation determines individual behavioural response.

Public expenditure theory is yet another economic dimension that affects explanations of participation in higher education. This theory is relevant because the cost component of educational demand theory is not a truly market-determined function. The true cost of education, for example, is not represented by tuition charges because government expenditures are subsidizing the difference between the actual costs of education and tuition fees. If the benefits to society for any goods or service are greater than the benefits accruable to the individual, private production would lead to a decrease of the benefit from society's viewpoint. As a representative of society's collective demand, government enters the picture to ensure that production will be guided by society's rather than the individuals desires. Goods and services whose production entails such decisions are known as 'merit wants'. Such goods and services are deemed so meritorious that their production is provided for through the public budget either in their entirety or over and above what is provided for through private production. Appropriately enough, education is deemed to be a merit want.

Economic factors are obviously very important to participation in higher education because of their impact on the key decisions made by individuals to enrol and on the decisions made by society to support higher education which affect participation by affecting access. But economic theory related to participation also presents problems that diminish its utility in trying to predict or explain participation. Among the most important of these are inadequate attention to the opportunity costs involved in making the decision to participate in higher education, sampling limitations such as lack of adequate data, too little attention to the role of government, and inadequate recognition of important variables such as motivation, attitudes, and other social and psychological factors.

(c) *Social Aspects*

A third aspect of participation is individual choice. Though not specifically connected to any theoretical framework, there is a large body of literature relating to the social and psychological factors that influence an individual's decision to particiapate in higher education. These fall generally into five categories :

(a) student characteristics such as mental and physical ability;
(b) attitudes and motivation;
(c) parental characteristics such as size and occupation and level of education;
(d) school characteristics such as size and peer influence; and

(e) other characteristics such as socio-economic level and *proximity to college.*

Among the most important of these determinants are socio-economic status, intelligence, and parental education and attitude.

(d) *Institutional Aspects*

Apart from the above there are institutional factors :

(1) The percentage of the population in a state employed in manufacturing should reflect individual opportunity costs. If there are large numbers of fairly well paid manufacturing jobs available in a state that do not require a college education, citizens will be drawn to the labour market. Therefore, if the percentage of the population employed in manufacturing is high, participation in higher education may be expected to be lower.

(2) The vocational programming of a state is also important. If a state has a well developed vocational education programme at the secondary school level, it may have diverted many potential higher education students away from colleges and universities. The percentage of the school population enrolled in secondary vocational programmes will reflect on the participation of the secondary students in higher education. In addition, since vocational programmes have been expanding into the adult market as have traditional programmes, another way to assess the relationship between vocational programming and participation is to evaluate the percentage of population enrolled in post-secondary vocational programmes. If the percentage of either of these variables is high compared to the total population, then participation in higher education would be expected to be low.

(3) Finally, the relative education level of the state population is also important. Some research has shown that there is a positive relationship between educational level of family members and the decision of a student to enter higher eduation. The higher the educational level of the state's population, the higher will be the participation rate in higher education.

Policy Implications

There are significant implications for public policy based on the higher education participation rate for a particular state, especially for states that have a relatively low rate of participation in higher education. States experiencing poor economic conditions may need to make major changes in their economic base in order to revitalize the economy. Low participation in higher education as it relates to the provision of a trained work force can significantly condition the degree to which change is posible.

Moreover, it is obvious that more research regarding the social and psychological aspects of potential participants is important. Early and current studies necessarily leave unexamined many important questions that bear directly upon participation in higher education and upon programmes to increase such participation. Preparation for higher education is always a personal matter. If effective educational counseling is to occur, greater knowledge is needed about personal values, *attitudes, needs*, and *perceptions*.

A more integrative approach to the study of educational participation is needed so that higher education policy formulation and implementation are both comprehensive and effective. Till that need is effectuated, personal income, state revenue levels, and past educational levels of a state population are the critical determinants of the rate of participation in higher education. Accordingly, policies directed toward influencing that rate must affect these determinants in order to achieve positive results. ☐

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Indian System of Medicine

Centuries ago, the Sanskrit scholars developed the Ayurvedic type of medicine. The Tamils developed siddha type of medicine. We have Unani style of medicine. All these are indigenous in character and must be studied together, said Hon'ble Justice P. R. Gokulkrishnan, Chief Justice of the Gujarat High Court while delivering the Convocation Address at the annual convocation of the Gujarat Ayurved University, Jamnagar. Justice Gokulkrishnan observed that the scholars of our ancient time were more interested in assimilating the knowledge and developing the science rather than nurturing parochial ideas with linguistic barriers. He made a strong plea to cut this gordian knot of linguistic barriers and parochial temperament and studying the literature on medicine—the treasure that is available in various languages. Excerpts

Ayurveda is a real science of life dealing with all its aspects. Its scope is not narrow and bound within watertight compartments. The science of Ayurveda includes all that is essential to make a man not only healthy but also happy. The word 'Ayurveda' is composed of two Sanskrit terms, viz., 'Ayur' meaning 'Life' and 'Veda' meaning the 'Knowledge' and taken together it means the 'Science of Life'. However, in a limited sense it is always used to imply 'The Science of Medicine'. It will be seen from this definition that Ayurveda lays emphasis not only on leading a life which is full of happiness, which implies an individualistic attitude but also leading a life which will be useful to society as a whole. Unless the society becomes happy, it will not be possible for the individual to attain or maintain his own happiness. The *individual should always make an* effort to subscribe to the happiness of the society and ayurvedic texts are replete with references to the manner in which the society can be kept happy. The Ayurvedic way of treatment also lends support to build up a socialistic pattern of society which is the aim and goal of our avowed aspirations in this democratic society. Thus, social, religious and moral education of an individual as a citizen is included in the science of Ayurveda. In this manner the study of Ayurvedic medicine is more scientific as a science of life than the western medicine. Ayurveda recognises that the man is very powerful both in the causation and cure of diseases.

Emotions like hurry, anger and pride are also treated as diseases since these things affect the health, happiness and longevity of an individual. Nowadays we find that even the western Allopathic style of treatment appreciates these factors and adopts them for their health *education*. Yoga *which is considered* to be a branch of Ayurveda is gaining momentum throughout the world. The scientific way of practising yoga is recognised as the sure method of conditioning the body and the mind. The conditioning the body and the mind by such practices of yoga with regular habits and character will make a person live without any *ailment. This is the basic trait of* Ayurvedic medicine as opposed to the symptomatic treatment which is more prevalent in other types of medicines.

One need not be averse to the sciences which have developed either in the West or in the East. Whatever is given has to be taken and assimilated but that should not stand in the way of research by delving deep into our system and baling out those useful knowledge in the field of medicine and surgery. Such type of colleges esta*blished to develop the indigenous* medicines often slip into the fold of western medicine forgetting the purpose for which such colleges and universities are established. *This is because of the* fact that the modern medicine is handy and easy to earn the livelihood and also to treat the patient symptomatically. I do not, for a moment, belittle the scientific advancement in the modern medicine but I am for encouraging side by side the development of our indigenous medicines from which we may some time dig out useful knowledge for treatment of patients suffering from incurable diseases. Basically we all have accepted that the civilisation of our nation, dates back to 5000 B.C. Mohanjodaro-Harappa Civilisation, the Gangetic Valley cultural advancement, the rich treasures in the ancient south have no parallel in the whole world. Our history points out the highest development in Astronomy, medical literature and other sciences in *our ancient India. The rich cul*tural heritage of the East has not been properly focussed. If once such research, more especially, in the field of medicine is taken up, I am sure, we will not only focus our rich tradition to the world but also will be of help to the citizens of the world in solving various problems in different fields. The western scholars like Max Muller *and others have appreciated* and admired the rich cultural traditions of our nation. But unfortunately we were not able to progress due to the foreign domination up-till we attained independence and it is only now we begin to feel the necessity of making research in this field.

Our ancient medicine developed in various parts of our nation must be studied together. Centuries ago the Sanskrit Scholars developed the Ayurvedic type of medicine. The Tamils developed Siddha type of medicine. We have Unani style of medicine. All these are indigenous in character having connection with each other. There is no watertight compartment except the language involved in it. The scholars of our ancient time were more interested in assimilating the knowledge and developing the science rather than nurturing parochial ideas with linguistic barriers. We must cut this gordian knot of linguistic barriers and parochial temperament and study the various literatures on medicine. which treasure is available in various languages. Fortunately we are still left with scholars who are proficient in Sanskrit, Tamil and various languages which have rich literature especially in the field of medicine. Before it is late we have to make use of those scholars for the purpose of digging out those mines and bringing out useful data for the benefit of the posterity.

There are two schools in Ayurveda. One is called Atreya school which primarily deals with medicine; the other called Dhanvantari School which mainly deals with surgery. No doubt, we are not having much literature given by these scholars. But the fact remains that surgery also was in a developed stage in our nation. As on date we are more on the medicinal side rather than the surgery in our native medicines and that is because of the fact that we are not able to get sufficient data and literature regarding our ancient surgery.

We have many inscriptions to show the practice of ancient medicine in our great nation apart from various inscriptions mentioning the establishment of hospitals with beds. I am happy that this University has affiliated colleges in Ayurvedic Medicine and those colleges have also hospitals with number of beds. It is my cherished desire that there must be separate hospital for our indigenous medicines in every town so that we will be in a position to propagate the usefulness of our ancient medicine. The redeeming feature of the Ayurvedic treatment is that this treats the individual as a whole. apart from the fact that the cost of the medicine is within the reach of lower strata of the society. There is no toxicity or any other side effect in such type of medicines.

The much wanted service in the society is that of the doctors. Dedication and sacrifice is the basic trait of the doctors. Those who have it, I am sure, are bound to succeed in this profession. The bedside manners. the pleasing words, the involvement in the profession and above all the humanitarian approach are some of the essential qualities of the doctors.

The Ayurvedic medicine is still to catch up. Research work is on and unearthing ancient medicine by delving deep into the literature is being carried on by Sanskrit scholars and others. In this stage the doctors who come out of such medical colleges have very great responsibility not only in establishing themselves but also in propagating the usefulness of the Ayurvedic medicine. The research work must be speeded up and the area of sure cure must be founded and practised in order to infuse confidence in the public.

Whatever you may say, the patients will never permit themselves to be experimented upon nor their relatives. Unless we prove the efficacy of the medicine at least in certain spheres, it will be very difficult for Ayurvedic Medicine to prosper and to become popular. This is because of the competition and progress which the Allopathic medicine has made in catching the attention of the public. One must strive hard and practise in that line where there is a definite cure or at least definite relief can be achieved. The Doctors who are produced from this University will understand the onerous task before them and involve themselves in the medical practice so as to be of help to the society. It is not earning that makes one's profession a success. It is the benefit that the profession gives to the society which ultimately benefits not only the profession but also the society at large. I am definite the Doctors produced in this University will carry the torch forward and succeed in the profession through their knowledge, dedication and character. The Ayurveda system of medicine must receive from all quarters encouragement and support to regain its past glory and to prove once again that it is an effective instrument to serve the mankind. This could be done by establishing hospitals with beds and with all necessary adjuncts for the same. It is a matter of gratification to learn that more Hospitals are going to be opened and funds are being made available for this purpose We are convinced that Ayurveda has basic infrastructure and potentiality to redress any ailment of the body and mind. That is why we require adequate publicity so that the citizens of this country and also the people of the world can enjoy the usefulness of this great medical science. I am sure, the governmental assistance would come forward in abundant measure to propagate our Indian medicines not only Ayurveda but Siddha, Unani and medicines akin to the same. ☐

CDS/ISIS Software Package

Institution of Information Technology (INFOTEK) recently organized a Workshop on "CDS/ISIS Software Package" at Central Leather Research Institute, Madras. The Workshop was co-sponsored by Department of Scientific and Industrial Research (DSIR), New Delhi, under its NISSAT (National Information System for Science and Technology) programme and Central Leather Research Institute (CLRI) under its NICLAI (National Information Centre for Leather and Allied Industries) programme.

While welcoming the participants, Dr. V.A. Kamath, President, INFOTEK, traced the achievements and the developments taking place in the area of high technologies such as computer, micrographics, telecommunication, etc. in India and abroad. He said that rapid growth of computerisation in India had created an ever-increasing demand for personnel capable of handling computers. He stressed the need of computerising information activities of Indian Library and Information Centres for effective dissemination of information.

Dr. K. Venkatasubramanian, Vice-Chancellor, Pondicherry University, in his inaugural address, reviewed briefly the world of computerised library and scientific information system which is poised to enter the 21st Century. He also took the opportunity to point out that the Pondicherry University, was in the process of setting up a modern library fully equipped with the latest library and information systems. He also traced the historical evolution in the field of computer-based library system and CDS/ISIS software. He proposed that there should be a net-working of libraries in India for effective use of information. Introduction of CDS/ISIS sosftware package for computerisation of library and information services in India was a milestone in the history of library development, he added.

Dr. R.B. Mitra, Director, Central Leather Research Institute, in his presidential address, explained the importance of the CDS/ISIS software package for the library and information work and stressed the need of putting it into practice immediately after the training.

There were 20 participants in the Workshop. 11 from Madras and the rest from Ahmedabad, Bangalore, Bombay, Calcutta, Delhi, Pune and Madurai.

The Workshop comprised some background lectures but emphasis was mainly on practicals in the form of hands on experience on computers. The topics covered were: introduction to computers, MS-DOS, file organisation, importance of database and its creation, CDS/ISIS micro version, ISIS, ISISDEF, ISISINV, ISISUTL, ISISPRT, ISISEXC, Search formulation and language, problems in using CDS/ISIS, etc. There were lectures on PERHOL (Periodical Holdings) Database and UNIX. The participants were trained to create their individual sample databases using the CDS/ISIS Package.

The participants were given an evaluation questionnaire for evaluating the Workshop. They provided feedback on the usefulness of the Workshop along with their suggestions for improvement. The reaction of the participants was very encouraging.

Dr. P.A. Mohanrajan, University of Madras, delivered the valedictory address and gave away the Certificates.

Dr. F.J. Devadason, Assistant Director (CLRI) and Vice-President, (INFOTEK) and Shri R. Vengan, Scientist (CLRI) and Secretary (INFOTEK) acted as Course Director and Course Convener respectively.

Indira Awaas Yojana

A two-day National Workshop on Low-Cost Technologies relevant to INDIRA AWAAS YOJANA and Primary School Building construction under NREP/RLEGP was recently organised by the Regional Housing Development Centre, Institute of Technology, Banars Hindu University, Varanasi. Sponsored by the Department of Rural Development, Ministry of Agriculture, Government of India, the Workshop was inaugurated by Shri Rajeev Ratan Shah, Commissioner, Varanasi Division and was presided over by Professor R.P. Rastogi, Vice-Chancellor, B.H.U. Shri B.S.S. Murthy, Adviser (Engg), Department of Rural Development, Government of India and Shri M.P. Mishra, Commissioner, U.P. Rural Housing Board, Lucknow also attended the inaugural function.

An exhibition depicting the use of various locally available low-cost materials in the State and many new low-cost construction technologies was put up on the occasion. A model house with kutcha bricks and a hut with different types of tiles were erected in the existing low-cost Demonstration House on the campus.

During the Demonstration, emphasis was laid on the type of Kutcha mud bricks and stone blocks instead of burnt readymade bricks in rural houses which are labour intensive and also cost effective. Methods of water proofing of mud walls with bitumen-oil mixture, rice husk mixed with mud and cow dung and also by polymer coating were demonstrated. Different low-cost appropriate leak proof and durable roofing materials were shown to the participants and the officials and a live demonstration of casting Prefabricated Arched Brick Panels and R.C. Beams developed by our Centre, was also held.

The Workshop has given a lot of input to this on-going National Programme of INDIRA AWAAS YOJANA and many practical suggestions were put forward during the deliberations for its better implementation in the state, both administratively and technically. The following major points were emphasised :

(1) The Scheme should be labour oriented so that it provides maximum employment opportunity to the scheduled castes, scheduled tribes and freed bonded labours.
(2) Locally available materials should be used and bricks, etc. be prepared at the site of construction itself.
(3) The houses should be cost effective, durable, leak & damp proof needing minimum maintenance and acceptable to the beneficiaries.
(4) Motivation is needed to create awareness amongst the beneficiaries towards sanitation and better environment.
(5) The beneficiaries should be involved in the construction of houses under Indira Awaas Yojana.

Around 130 participants comprising Executive Engineers, Assistant Engineers, Project Directors, Junior Engineers and Block Development Officers from various districts of Uttar Pradesh attended the workshop .

Training the Talented

The University Grants Commission (UGC) has approved a scheme for opening of an ideal college for undergraduates in the University of Poona and Panjab University, to give special training for the talented students. This was disclosed by Dr. V.G. Bhide, Vice-Chancellor, Poona University recently.

The students selected for such special education would have university professors as their teachers under the experiment The batches selected could be from 200 to 250 each at Poona or Chandigarh. The experiment would first take in science faculty students only and later be extended to students of other faculties. The special college would be controlled by the UGC but run by the two respective universities.

Dr. Bhide said this special college for the undergraduate science faculty students would be located on behalf of the university in Pimpri-Chinchwad area.

The UGC has also approved another special project for Poona University of setting up of a regional science laboratory. This would be computerised and would have knowledge of all science faculty books. This is being located in Pune to be run by the University of Poona and to be financed as a pilot project by the UGC.

News from Agril. Varsities

Environment & Sustainable Nutrition Security

Dr. M S. Swaminathan, President, International Union for the Conservation of Nature and Natural Resources, called for evolving a policy for preserving the country's flora and fauna. He said there was a need for an action plan involving the public, professionals and political leaders for conserving and utilising the national wealth. Agricultural assets were in various stages of degradation. There was time still to reverse the process. Dr. Swaminathan was delivering the first Dr M.S. Randhawa Memorial Lecture Series at Punjab Agricultural University.

Speaking on "Environment and Sustainable Nutrition Security", Dr Swaminathan said block-level land-management practices with appropriate attention to conservation, restoration of degraded land sustainable intensification for agricultural purposes was the need of the hour. Rain water and aquifer (ground water) management, wetland management, conservation of coastal mangroves and sustainable use of surface water, all required attention. The country's vast river and ocean resources needed to be kept free of pollution and siltation.

Dr Swaminathan stressed on a national action plan for the conservation of forest ecosystems, particularly in the Himalayas, the Western Ghats, the Vindyas and the Eastern Ghats. He pointed out that besides atmospheric pollution, the long-term consequences of deforestation and increased consumption of fossil fuels were now receiving serious global attention. A recent global conference held at Toronto in Canada considered the implications of the changing atmosphere for global security.

Dr. Swaminathan said nutrition security implied physical and economic access to a balanced diet and safe drinking water. "While we have attained a degree of food self-sufficiency, we are a long way off in the matter of developing a national nutrition security system," he said.

Statistically, the country had to produce 230 to 250 million tonnes of foodgrains. It had increased its capacity to 75 million tonnes per year during the past 20 years. It had to repeat the performance during the next 12 years as well to meet the needs of rising population.

He also stressed on the need to control animal population. He however said that animal population suffered from undernutrition and animal fodder and feed security system was yet to be developed. "We need to produce each year about 700 million tonnes of livestock fodder," he said.

Laying emphasis on economic security, Dr. Swaminathan said unless 200 million additional jobs were created in rural areas within the next 12 years, there would be a big cut in the earnings of rural families who would be forced to seek work in towns and cities.

AIU News

Standing Committee to Meet at Bombay

The 217th meeting of the Standing Committee of the Association of Indian Universities (AIU) will be held at Bombay on 6th August, 1988. Dr. P.V. Salvi, Vice-Chancellor, Marathwada Krishi Vidyapeeth and President of the Association of Indian Universities will preside.

A number of important items will come up for discussion at the meeting. It will consider requests from Indira Gandhi Krishi Vishwavidyalaya, Raipur and the University of Agricultural Sciences, Dharwar for grant of Provisional Membership of the Association. Suggestions, made at the meeting of the Standing Committee on Foreign Students set up by the Ministry of External Affairs will also come up for discussion at the meeting. Suggestions inter-alia include simplification of the procedure for the AIDS tests on foreign students, drawing up a list of universities where foreign students could be admitted on the basis of available resources in terms of academic staff, appropriate courses, accommodation, etc. Another suggestion pertains to the introduction of a Language Proficiency Course in the regional language concerned where the foreign students were studying to help them pick up conversational language and move about freely. The Committee will also have for its deliberations a reference from the University Grants Commission (UGC) as to the opinion of the Association on the departure made in the Acts of Telugu University, Hyderabad and the University of Health Sciences, Vijayawada that the Chief Minister of Andhra Pradesh shall be the Chancellor of these Universities.

The Standing Committee will also consider the proposal received from the Indian Council of Medical Research (ICMR) for an Inter-University debate on the subject "Would legislation prohibiting Indian residents from having sexual intercourse with foreigners and visiting non-resident Indians be violative of the Constitution-

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ASSOCIATION OF INDIAN UNIVERSITIES

CORRESPONDENCE COURSE IN EVALUATION METHODOLOGY & EXAMINATIONS

Applications are invited from college/university teachers for admission to Correspondence Courses in Evaluation Methodology and Examinations at Basic Level, Intermediate Level and Advanced Level/ Special Professional Course. The duration of each of the three courses is six months. A personal 'Contact Programme' for three days is planned for each of the three courses. Universities/Institutions sponsoring candidates can meet the registration/course fees from out of unassigned grants by UGC.

Request for prospectus and application form accompanied by a crossed Indian Postal Order for Rs. 10/- drawn in favour of the Secretary, Association of Indian Universities and a self addressed stamped envelope (Rs. 2/-) should reach the Director (Research), Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi 110002. Last date for receipt of applications is **15th September** for non-sponsored and **26th September, 1988** for sponsored candidates.

al Right to Privacy ?" It will also consider suggestions received from member universities regarding the modalities for Inter-University Exchange of Teachers to counteract inbreeding. Universities' involvement in the Mass Programme for Functional Literacy Mission is also likely to come up for the consideration of the Committee.

The Standing Committee will also have for its consideration the reports of sub-committees like the Cultural Committee that met on 29th July at Delhi, Sub-Committee on Introduction of Productivity Centres at Universities that meets a day earlier on 5th August and the Sports Committee that will meet on 6th August. Thoughtful deliberations resulting in meaningful recommendations are expected to take place at the meeting.

Public Relations in Educational and Research Institutions

The Association of Indian Universities, in collaboration with the Tata Institute of Social Sciences and Bharatiya Vidya Bhawan, Bombay, will organise a Group Discussion-cum-Orientation Programme for Public Relations Officers working in educational and research institutions from 7th August to 12th August, 1988. About 50 persons including Public Relations Officers, Assistant and Deputy Registrars in charge of PR activities in universities, Deans of Students, Heads of Publication Divisions and PR men in CSIR laboratories and Agricultural Research Stations, are expected to participate.

Mr. Ram Mohan Rao, Principal Information Officer, Press Information Bureau, Govt. of India, will inaugurate the programme. Dr. P.V. Salvi, Vice-Chancellor, Marathwada Krishi Vidyapeeth and President of AIU would preside over the inaugural function. Mrs. Adity Syam, President, Public Relations Society of India and former Presidents, Mr. Ajit Gopal, Mr. Narsimha Reddy and noted Public Relations practitioners like Mr. Anil Basu will moderate different sessions. Prof. M.R. Dua and Prof. Pillai, from Indian Institute of Mass Communication, New Delhi and Prof. Bashiruddin, Head of Department of Journalism, Osmania University, Hyderabad would be the Chief panelists. The topics to be discussed at length are Modern Technology in Public Relations, Development of Academic Corporate Culture, Visual Communication, Media Relations, Public Opinion Research Specialised News, Advertisement and Publicity.

At the conclusion of the deliberations, the Group will suggest guidelines for development of public relations activities in educational and research institutions.

It is also proposed to have field visit to Goa in continuation of the programme.

News from Abroad

Commonwealth of Learning

The Heads of Commonwealth Governments at their meeting at Vancouver in 1987 agreed to create a Commonwealth institution for cooperation in distance education. The Working Group constituted for the purpose has since made detailed proposals which are now under consideration of the Commonwealth governments. To be named, "Commonwealth of Learning", in case the report of the Working Group is approved, the institute will be set up with Headquarters in Vancouver. The objective of Commonwealth of Learning is to promote human resource development through a sharing of Commonwealth distance education experience and resources. It will have functions in the exchange of information about distance education, in staff training and institutional development, and in promoting the sharing of distance education materials.

Positions Available

The Commonwealth Secretariat has recently advertised the positions of President (Chief Executive) and other senior staff for the Commonwealth of Learning. The President, who will be the Executive Head, will be expected to develop and oversee cooperative projects involving educational institutions in a network throughout the Commonwealth and will secure support from governments and other sources for the expansion of this work. The President will report to the Board of Governors, drawn from Commonwealth countries. Educational leaders of international stature from Commonwealth countries who combine international experience, an understanding of the application of distance education in development, excellent interpersonal skills, and demonstrated ability in government relations, management and fund raising are eligible to apply. They must have energy, initiative and innovative ability to launch a new organisation.

Senior professional posts will be at the level of departmental head reporting direct to the President. Two or three posts are likely to focus on distance education cooperation in relation to particular subjects and disciplines and their incumbents will be responsible for identifying needs, locating courses and materials to meet them, arranging access and adaptation, and where necessary promoting the development of new materials for shared use. Likely areas for initial attention include science mathematics; accountancy/management; professional areas like health, education, engineering; and agriculture/rural development. Applicants for these posts should have a strong professional base in an appropriate disciplinary area as well as experience of distance education.

Other posts will be oriented to distance education techniques and organisation including promoting of training, application of communications technology in countries whose circumstances vary, consultancy services in developing distance education systems and institutions. Successful candidates will have experience of the application of distance education methods in more than one country, including developing countries.

The administrative/finance officer will be responsible for developing management procedures and the financial framework for the new organisation and will require experience of public administration and financial management preferably in an international context.

Further details can be had from Mr. Peter RC Williams, Director, Education Programme, Human Resource Development Group, Commonwealth Secretariat, Marlborough House, Pall Mall, London SW1Y 5HX.

The Last date for applications/nominations to reach the Secretary General, Commonwealth Secretariat is 31 August, 1988.

Attention Scientists and Technologists

Indian Expertise in Science and Technology

The Research Cell in Economics of Education of the Association of Indian Universities is conducting a survey of Indian expertise in science and technology in the University sector. It is proposed to prepare a comprehensive database of the skills, knowledge and facilities of the university level institutions as well as a directory of experts in various disciplines of science and technology. The survey is also intended to catalogue the expertise and current research work of Indian scientists and technologists in various fields of science and technology, and will be used as an input for the compilation of a comprehensive database on the scientific and technical manpower in the country. The database will provide a ready reference to the industry, commerce and allied sectors of Indian economy for identifying experts in the relevant fields.

The scientists and technologists engaged in teaching and research in the universities and university level research institutions in India **at the lecturer or equivalent and above levels only** are requested to fill-up the prescribed form, which can be had from the undersigned. The completed form should be returned latest by **September 30, 1988.**

The responses from the academic and research staff are solicited, and their cooperation would be highly appreciated in our venture to build up a comprehensive database.

For the prescribed form, kindly write to:

M M Ansari
Joint Director
Research Cell, Economics of Education
Association of Indian Universities
AIU House, 16 Kotla Marg
NEW DELHI 110 002

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AIU Library & Documentation Services

One of the important functions of the Association of Indian Universities is to act as a clearing house of information on higher education in the country. Towards this end the AIU Library is engaged in collection building and developing instruments for the dissemination of research information. Over the years a valuable collection of books and documents on different aspects of higher education has been acquired.

The Library has also developed Bibliography of Doctoral Dissertations as an effective tool in the dissemination of research information. Retrospective bibliographies covering the period 1857-1970 and 1970-75 were the first to appear. Effective 1975, however, the bibliography is issued annually in two volumes. One volume deals with Natural and Applied Sciences while the other records doctoral degrees awarded in Social Sciences and the Humanities. In addition to the normal bibliographical details like the name of the Research Scholar, the title of the thesis, years of registration for and award of the degree, and the name of the University accepting the thesis for award of a doctoral degree, the bibliography also gives name and complete address of the supervising teacher and an availability note that seeks to inform whether a copy of the dissertation is available for consultation and use in the University Library/Department or Registrar's Office.

The columns 'Theses of the Month' and 'Research in Progress' are intended to cut out the time lag between the receipt of information and its inclusion in bibliography. Such Universities as are not sending us regular information in respect of Doctoral Theses accepted and research scholars enrolled are welcome to make use of these columns.

The Library is open from 9.00 a.m. to 5.30 p.m. Monday through Friday.

RESEARCH IN PROGRESS

A List of Research Scholars Registered for Doctoral Degrees of Indian Universities

PHYSICAL SCIENCES

Mathematics

1. Ajan, K.S. *To study the ideals of Banach lattices.* Kerala. Dr. K.I. Koshy, Pool Officer, Department of Mathematics, University of Kerala, Trivandrum.

2. Ajitha, G. *Some of the properties of regular semigroups.* Kerala. Dr. R. Veeramony, Prof, Department of Mathematics, University of Kerala, Trivandrum.

3. Chettiar, N. Ganapathy. *Some problems regarding homological properties of modules and cancelation of projective modules and related topics.* Kerala. Dr. M. I. Jinnah, Reader, Department of Mathematics, University of Kerala, Trivandrum.

4. Geetha, K. *To explore the conditions under which subspace of LCE. F become Banach lattices of operators.* Kerala. Dr. K.I. Koshy, Pool Officer, Department of Mathematics, University of Kerala, Trivandrum.

5 Muraleedharan, S. *Theory of regular semi-groups.* Kerala. Dr. R. Veeramony, Prof., Department of Mathematics, University of Kerala, Trivandrum.

6. Patil, G.H. *A study of the identification problems in mathematical models of structural systems.* Shivaji. Dr. M.S. Prasad, Prof. and Head, Department of Statistics, Shivaji University, Kolhapur.

7. Roy, N.J. Jacob. *The positive operations between Banach lattices with emphasis on their spectra.* Kerala. Dr. K. I. Koshy, Pool Officer, Department of Mathematics, University of Kerala, Trivandrum.

Statistics

1. Dhandra, B.V. *Stochastic inventory models for substitutable items.* Shivaji. Dr M. S. Prasad, Prof. and Head, Department of Statistics, Shivaji University, Kolhapur.

Chemistry

1. Abdus Sattar. *Synthetic studies in natural products.* Shivaji. Dr. R.B. Mane, Reader, Department of Chemistry, Shivaji University, Kolhapur.

2. Mathur, Madhvi. *Structural, thermoanalytical and antimicrobial studies of metal chelates of benzohydroxamic acids.* Devi Ahilya. Dr. Farooqui, Prof., Department of Chemistry, Islamia Karimia College, Indore.

3. Mishra, Namita. *Kinetics and equilibria studies of electron transfer reactions of alditols and metal cations.* Devi Ahilya. Dr. A.G. Fadnis, Prof., Department of Chemistry, Holkar Science College, Indore.

4. Panicker, Sreelatha S. *Characterisation and functionality studies on solid propellant binders.* Kerala. Dr. K.N. Ninan, Head, Analytical and Spectroscopy Division, V.S.S.C., Trivandrum and Dr. C. G. Ramachandran Nair, Prof. and Head, Department of Chemistry, University of Kerala, Trivandrum.

5. Sharma, Narendra Kumar. *Electrochemical and thermal properties of some typical solids of Indore Region.* Devi Ahilya. Dr. P. V. Khadikar, Head, School of Chemistry, Vigyan Bhawan, Khandwa Road, Indore and Dr. D.D. Dube, Soil Survey Officer, Salt Affected Soils Project, College of Agriculture, Indore.

6. Suri, Parvinder. *Synthesis and characterization of some first row transition metal salicyl hydrazides.* Devi Ahilya. Dr. M.A. Farooqi, Principal, Islamia Karimia College, Indore.

7. Tomar, Govind Singh. *Studies on the chemical composition of common feeds and fodders of Malwa Region of Madhya Pradesh.* Devi Ahilya. Dr. P.T. Malse, Prof. and Head, Department of Chemistry, Holkar Science College, Indore and Dr. D.D. Dube, Soil Survey Officer, Salt Affected Soils Project, College of Agriculture, Indore.

Earth Sciences

1. Sabale, V. P. *Petrographic palyno stratigraphic and geothermometric studies around Pasara-Chelvai area of Godawari Valley, A.P.* Shivaji. Dr. R.R. Patil, Head, Department of Geology, Shivaji University, Kolhapur.

BIOLOGICAL SCIENCES

Anthropology

1. Jibonkumar Singh, S. *Genetic micro differentiation in the Meitei population groups of Manipur and other States of North East India : A study of micro evolutionary change.* Manipur.

Biochemistry

1. Anil Kumar, N. *Studies on the interactions of hepatocytes with the extracellular matrix macromolecules* Kerala. Dr. P.R. Sudhakaran, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

2. Asha Kumary, L. *Nicotine administration and lipoprotein metabolism in rats.* Kerala. Dr. P. L. Vijayammal, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

3. Elias, Merina. *Role of extracellular matrix on the biochemical activity of hepatocytes in culture.* Kerala. Dr. P.R. Sudhakaran, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

4. Jose, Geena Alice. *Comparative biochemical analysis of leaf and tuber proteins of two varieties of tapioca (one tasty and another ordinary) Manihut esculenta cultivated in Kerala.* Kerala. Dr. K. T. Augusti, Prof., Department of Biochemistry, University of Kerala, Trivandrum.

5. Kumud Kumari. *Biochemical effects of sulfoxide amino acids isolated from onion, Allium cepa Linn on experimental animals.* Kerala. Dr. K.T. Augusti, Prof., Department of Biochemistry, University of Kerala, Trivandrum.

6. Laloraya, Malini. *The role of free radicals in implantation.* Devi Ahilya. Dr. M.M. Laloraya, Head, School of Life Sciences, Devi Ahilya Vishwavidyalaya, Indore.

7. Manoj, G. *Dietary fiber and metabolism of lipids and glyco conjugates.* Kerala Dr. S. Leelamma, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

8. Nageswari, K. *Investigations on inositol lipids in liver.* Kerala. Dr. Venugopal P. Menon, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

9. Philip, E. Sussy. *Investigations on the extracellular matrix of the mammary gland.* Kerala. Dr. P.R. Sudhakaran, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

10. Radhakrishna Pillai, G. *Studies on ascorbic acid-2 sulphate.* Kerala. Dr. P.L. Vijayammal, Reader, Department of Biochemistry, University of Kerala, Trivandrum and Dr. M. Indira, Technical Officer, Department of Biochemistry, University of Kerala, Trivandrum.

11. Vijayalakshmi, P.B. *Investigations on pesticide toxicity in iron deficiency.* Kerala. Dr. K. Saraswathy Devi, Reader, Department of Biochemistry, University of Kerala, Trivandrum.

Microbiology

1. Kheda Singh. *Physiological and biochemical studies on the host parasite relationship between Nacenga porphyroeuma and Ustilago coaxinclies.* Manipur.

2. Malhotra, Shramja. *Microflora associated with decay in living trees of Picea smithiana wall boiss.* HP. Dr. T.N. Lakhanpal, Department of Biosciences, Himachal Pradesh University, Shimla.

3. Thounaojam, Basundhara. *Investigation on the biochemical and physiological aspects of the wood rotting fungus Clitocybe sp. I N tek-tek-pal and its host pathogen relationship.* Manipur.

Botany

1. Anita Devi, H. *Cytotaxonomic studies on orchids from Manipur.* Manipur.

2. Bhubaneshwari Devi, Mr. *Studies on the biology and control of certain major insect pests of mango in Manipur.* Manipur.

3. Chaman Lal *Wood anatomical characteristics of timbers used for packaging.* HP. Dr. P.K. Khosla and Dr. M.K. Seth, Department of Biosciences, Himachal Pradesh University, Shimla.

4. Damayanti Devi, M. *Induced radiotoxicity in pineapples to improve preservation.* Manipur.

5. Gupta, Krishan Chand. *Tracheid length variation in blue pine Pinus wallichiana A.B. Jackson.* HP. Dr. M.K. Seth, Department of Biosciences, Himachal Pradesh University, Shimla.

6. Jajoo, Anjana *Role of anions in photosynthetic electron transport.* Devi Ahilya. Dr. S. Bharti, Reader, School of Life Sciences, Devi Ahilya Vishwavidyalaya, Indore

7. Kameshwar Singh, A. *Genetics of alkaloids producing solanaceous plants of North Eastern India.* Manipur.

8. Khare, Mamta. *Studies on the influence of light and plant hormones on the chlorophyll anthocyanin ratios* Devi Ahilya. Dr. K. N. Guruprasad, Reader, School of Life Sciences, Devi Ahilya Vishwavidyalaya, Indore.

9. Khumanthem, Umabati. *Physiological significance of potassium in indigenous maize, Zeamay.* Manipur.

10. Lorho, M.K. *Effect of N.D. and K on the yield, nutritional status and fossil quality of capsicum crops.* Manipur.

11. **Phulari, S.S.** *Cytological and physiological studies in chillies.* Shivaji. Dr. B.A. Patil, Principal, Willingdon College, Sangli.

12. **Radzirani Devi, W.** *Effect of burning on the structure and dynamics of grassland ecosystem of Manipur.* Manipur.

13. **Samvatsar, Swati.** *The floristics and biological spectrum of Jhabua District, M.P. with notes on ethnobotany.* Devi Ahilya. Dr. V. B. Diwanji, Prof., Department of Botany, Holkar Science College, Indore.

14. **Sud, Keshav Chander.** *Morphological and embryological studies in some taxa of asteraceae.* H.P. Dr. S.K. Sood, Department of Biosciences, Himachal Pradesh University, Shimla.

Zoology

1. **Devanath, A.K.** *Studies on the biology, host parasite relationship and control measure of uzi fly in Manipur.* Manipur.

2. **Dhiren Singh, L.** *The chromosomal studies in fresh water cyprinid and cobitid fishes.* of Manipur.

3. **Dhiren Singh, N.** *Studies on the biology of endemic cyprinid fishes of Manipur.* Manipur.

4. **Homeshwor Singh M.** *Cytochrome P-450 system in fish : Their role in adaptation to pollution.* Manipur.

5. **Jaiswal, Kiran.** *Taxonomical and histochemical studies on nematodes of some carnivorous vertebrates from Himachal Pradesh.* HP. Dr. D.C. Kalia, Department of Biosciences, Himachal Pradesh University, Shimla.

6. **Kanungo, Tanuja.** *Effects of radiation on some haematological and biochemical parameters in a mammal.* Devi Ahilya. Dr. Rampal Singh, Prof. and Head, Department of Zoology, Holkar Science College, Indore.

7. **Mema Devi** [illegible] *of chromosomes by differential staining in some* [illegible] Manipur.

8. **Nilakanta Singh, N.** *Taxonomic studies on the odonate fauna of Manipur.* Manipur.

9. **Premila Devi, O.** *Analysis of chromosome during mitosis and meiosis in Tasar and eri silkworm.* Manipur.

10. **Ranabir Singh.** *Morpho-histology of the digestive, reproductive systems and certain aspects of osthology of some fresh water cyprinoids in Manipur.* Manipur.

11. **Sadani, Neena.** *Limnological studies on Sirpur tank, Indore with special reference to feasibility for fish production.* Devi Ahilya. Dr. D.S. Thakar, Prof., Department of Zoology, Holkar Science College, Indore.

12. **Sanahanbi Devi, L** *Endocrine physiology of amphibia.* Manipur.

13. **Verma, Nandini.** *Studies on the histopathological, histochemical and biochemical changes in certain organs of a mammal after ratiation.* Devi Ahilya. Dr. D S. Thakar, Prof., Department of Zoology, Holkar Science College, Indore.

14. **Vidyarani Devi, W.** *Reproduction and behaviour biology of the Chinese dove Streptopnia chinemses.* Manipur.

Agriculture

1. **Upadhyay, M.S.** *Study of the effect of four levels of phosphorus on soyabean and soyabean + pigeonpea intercropping system and its residual effect.* Devi Ahilya. Dr. Y.M. Upadhyaya, Senior Scientist (Retd), I.A.R.I. Regional Station, Indore.

Medical Sciences

1. **Harikumar, C.** *A critical study of infants of diabetic mothers.* Kerala. Dr. N.S. Suguna Bai, Prof. and Head, Department of Child Health, S.A.T. Hospital, Medical College, Trivandrum and Dr. Elsie Philip, Principal, Medical College, Trivandrum

THESES OF THE MONTH

A List of Doctoral Theses Accepted by Indian Universities.

PHYSICAL SCIENCES

Mathematics

1. **Bhattacharyya, Sikha.** *Some applications of perturbation techniques in Plasma Physics.* Calcutta.

2. **Dange, Snehal Madhukar.** *A study of some properties of Generalized Stieltjes Transform.* Shivaji. Dr. M.S. Chaudhari, Department of Mathematics, Shivaji University, Kolhapur.

3. **De, Uday Chand.** *Some types of Riemannian spaces.* Calcutta.

4. **Deo, Shridhar.** *Some problems of physical distributions in Robertson Walker universe.* Manipur. Dr. R.K. Tarachand Singh, Assoc. Prof., Department of Mathematics, Manipur University, Imphal.

5. **Dhanapal, C.** *Numerical solutions of some problems of flow and heat transfer in micropolar fluids.* Roorkee

6. **Patel, Gokulananda.** *Study on computational aspects of solid transportation problem.* Sambalpur. Dr. C. Das, Asstt. Prof., Department of Mathematics, R.E. College, Rourkela.

7. **Sharma, Suresh Chand.** *Integral transforms and their applications.* Rajasthan. Dr. M.C. Gupta, Prag Villa, B-63 University Marg, Bapu Nagar, Jaipur.

8. **Syeda Lateef Unnisa Begum.** *Analysis of mathematical models to problems in life science.* Osmania.

Statistics

1. **Rout, Udayanath.** *Some properties of a generalized discrete distribution : The generalized Poisson distribution.* Utkal.

Physics

1. **Borkar, Bhupesh Tulshiram.** *Magnetic, structural and other associated properties of magnetoplumbite ferroxides*

Nagpur. Dr. D.K. Kulkarni, Institute of Science, Nagpur.

2. Das, Mochiram. *Study of baryons in an independent quark model approach.* Utkal.

3. Karmakar, Suprabha. *Investigation on the magnetic, optical and thermal properties of some rare-earth crystalline complexes.* Calcutta.

4. Khurana, Indira. *Elastic and inelastic scattering of various projectiles with hydrogen and helium atoms.* Roorkee.

5. Kulkarni, Vasant Ramchandra. *Structural, electrical and magnetic study of some mixed ferrites.* Shivaji. Dr. A.S. Vaingankar, Reader, Department of Physics, Shivaji University, Kolhapur.

6 Kundu, Himansu Kumar. *Study of lyoluminescence of some biological crystals using different radiations.* Calcutta.

7. Mohanakumar, K. *An investigation of the influence of solar cycle on middle atmospheric temperature.* Kerala. Dr. S. Devanarayanan, Reader, Department of Physics, University of Kerala, Trivandrum.

8. Satheesh Kumar, M.K. *Photoacoustic effect : Some applications in Laser technology.* Dr. C.P. Girijavallabhan, Prof., Department of Physics, Cochin University of Science and Technology, Cochin.

9. Saxena, Atul. *Measurement of heavy iron ranges in elemental and complex media using solid state nuclear track detectors.* NEHU. Dr. K.K. Dwivedi, Department of Chemistry, North Eastern Hill University, Shillong.

10. Shashi Prabha. *Analysis of gamma spectra of different isotopes.* Magadh.

11. Syam Sundar, Nulu. *Infrared, Raman, ultraviolet and photoacoustic spectra of certain substituted toluenes and phenols.* Andhra.

12. Todkar, Maruti Mahadeo. *Electrical, magnetic and x-ray diffraction study of* $Cu_{1-x}Fe_{2+x}O_4$ *ferrite system.* Shivaji. Dr. A.S. Vaingankar, Reader, Department of Physics, Shivaji University, Kolhapur.

13. Veeraswamy Naidu, Seatala. *Isochronal annealing study on radiation induced defects in metals-Mo, Ni and Nb-by positron annihilation.* Calcutta.

14. Venkateswar Rao, J. *Satellite radio beacon studies of the ionosphere.* Osmania.

15. Viswanathan, K. *Raman and IR studies of certain double anion compounds and tetrameta phosphates.* Kerala. Dr. G. Aruldhas, Prof., Department of Physics, University of Kerala, Trivandrum.

16. Viswanathan, K.S. *Study of the electrodynamics of the equatorial electrojet.* Kerala. Dr. C.A. Reddy, Director, SPL, VSSC, Trivandrum.

Chemistry

1. Agarwal, Rakesh. *Studies on diazoketones : Action of diazoalkenes on acid chlorides with two or more sites of reactivity.* S. Gujarat. Dr. P. Bahadur, Department of Chemistry, South Gujarat University, Surat.

2. Badhwani, Ram. *Studies on solute solvent interactions of electrolytes in some polyhydroxy alcoholic solution.* Awadh. Dr. Vishnu, Department of Chemistry, Gorakhpur University, Gorakhpur.

3. Barua, Tapas Kumar. *Studies on lectin receptors.* Calcutta.

4. Bhattacharyya, Atanu. *Chemistry of 3-acyl-4oxo-4H-(1) benzopyrans.* Calcutta.

5. Bikram Singh. *Chemical investigation of some Indian medicinal plants.* Avadh. Dr. R.S. Thakur, Deputy Director, C.I.M A.R. Lucknow.

6. Datta, Asis Kumar. *Studies on the floral and faunal lipids of Sundarban mangrove ecosystems.* Calcutta.

7. Datta, Nabanita. *Studies on the chemical constituents of some indigenous plants of biological interest.* Calcutta.

8. Deshpande, Subodh Shrinivas. *Studies into trace level determination of elements by polarography and stripping voltammetry.* Nagpur. Dr. A P. Joshi, Department of Chemistry, Nagpur University, Nagpur.

9. Garg, Neelam. *Polarographic studies of some organic ligands and their metal complexes.* Rajasthan. Dr. C.M. Gupta and Dr. V.K. Sharma, Department of Chemistry, University of Rajasthan, Jaipur.

10. Gupta, Durga Shankar. *Studies on Lewis acid behaviour of organobimetallic tetrathiocyanate and Selenocyanate.* Avadh. Dr. P.P. Singh, Principal, Bareilly College, Bareilly.

11. Gupta, Prakash Chand. *Study of some complexation processes at dropping mercury electrode.* Rajasthan. Dr. C.M. Gupta, Krishna Kutir, 2 GA-24 Jawahar Nagar, Jaipur.

12. Harendra Singh. *Studies on soil, water and weather of Sarva Canal Pariyojana in Block Gilaula, District Bahraich* Avadh. Dr. P.P. Singh, Principal, Bareilly College, Bareilly.

13. Juneja, P.L. *Investigations into material properties of green leaves.* Ghasidas. Dr. G.P Chhalotra and Dr. A N. Gavai, Government Engineering College, Bilaspur.

14. Kalyani, G. *Anodic oxidation of metals like titanium, zirconium and niobium.* Osmania.

15. Khan, Zafruddin. *Hepatic endoplasmic reticulum and dietary protein : A biochemical study in rats.* Avadh. Dr. U.K. Mishra, Department of Biochemistry, V P. Chest Institute, Delhi University, Delhi.

16. Lakshmi Narayanan, S. *Lead corrosion in batteries.* Osmania.

17. Mandwal, Ashok Kumar. *Chemical and antimicrobial studies on the antibiotic-X-1020.* Avadh. Dr. M.C. Bhatia, Asstt. Director, C.D.R I., Lucknow.

18. Marathey, Ushaprabha Madhav. *Fluorescence spectral studies of some pyromellitein dyes.* Shivaji. Dr. C.K. Bhaskare, Reader, Department of Chemistry, Shivaji University, Kolhapur.

19. Memariani, Mahmoud. *Chemical studies of transformation of steroids.* Osmania.

20. **Mohanadas, C.** *Some redox titrations using N-bromophthalimide and N-bromo succinimide.* Kerala. Dr P. Indrasenan, Reader, Department of Chemistry, University of Kerala, Trivandrum,

21. Mohapatra, Biswamohan. *Chemical annealing of damage fragments in gamma irradiated pure and doped potassium nitrate.* Utkal.

22. Nath, Ranendu Kumar. *Physico-chemical investigation of the capsular polysaccharide of Klebsiella serotype-K-40.* Calcutta.

23. Patki, Geeta Kishor. *Spectrophotometric investigation of the reaction of certain chromogenic reagents in the presence of some surface active reagents.* Nagpur. Dr. S. P. Sangal, L.I.T., Nagpur.

24. Ramesh, D. *Synthesis of nucleo and extranucleo heterosteroids.* Osmania.

25. Rao, Jyoti. *Studies on potential psychotropic agents.* Avadh. Dr. A.K. Saxena, Scientist, Division of Medicinal Chemistry, C.D.R.I., Lucknow

26. Samanta, Anushree. *Coordination chemistry : Studies on mixed ligand complexes of UO_2 (VI), Th (IV), and Co (II), Ni (II), Cu (II), Zn (II), VO^{2+} (IV) and Cd (II).* HS Gour. Prof. M C. Saxena, Department of Chemistry, Dr Hari Singh Gour Vishwavidyalaya, Sagar

27. Samantaray, Rabindra Nath. *Nitrogen transformation in submerged soils in high rainfall areas and its relation to nitrogen management for growing rice on rainfed low lands.* Utkal.

28. Sharma, S.P. *Studies [illegible]: Synthesis of 2,[illegible]chromanones, [illegible] chromanones.* Avadh. Dr. S. Durani, Assoc. Prof., Department of Chemistry, IIT Bombay.

29. Singh, Rajkumar Hemo Kumar. *Reaction of transition metal ions with nitrile group in presence of alcohols.* Manipur. Dr. A.B. Manihar Singh, Department of Chemistry, Manipur University, Imphal.

30. Sivaram, Ch. *Characterization and evaluation of catalysts prepared by precipitation from homogeneous solution.* Osmania.

31. Srivastava, Beena. *Spectral and physico-chemical studies of Schiff base complexes of organomercury compounds.* Avadh. Dr. P.P. Singh, Principal, Bareilly College, Bareilly.

32. Srivastava, Rashmi. *Chemical studies of biologically active plants.* Avadh. Dr. D. S. Kulshrestha, Assistant Director, C.D.R.I., Lucknow.

33. Sudhakar Rao, V. *Synthesis of Bis, Benzopyrano, Furoquinolones and their anticoagulant activity.* Osmania.

34. Venkata Krishna Rao, Potluri. *Some new analytical aspects of Cacotheline as Redox indicator.* Andhra.

35. Venkateshwar Rao, K. *Synthesis of hetero steroids.* Osmania.

36. Verma, Lata. *Non-isothermal studies on thermal decomposition of some inorganic complexes.* Magadh.

37. Verma, Upendra Nath. *Kinetic parameters of some complexes of metals with nitrogen-sulphur containing ligands.* Magadh.

38. Vishnudhari. *Studies on solution properties of biomolecules in electrolytic solution.* Avadh. Dr. Vishnu, Department of Chemistry, Gorakhpur University, Gorakhpur.

Earth Sciences

1. Jayappa, K.S. *A study of beach morphology and near shore geomorphology of the Mangalore Area.* Mangalore. Dr. K.R. Subramanya, Reader and Head, Department of Marin Geology, Mangalore University, Mangalagangotri.

2. Niranjan Kumar, K. *Hydrogeological studies in Gajwel Taluk, Medak District, with reference to rural development.* Osmania.

3. Prabhakar, P. *Primary and secondary geochemical dispersion patterns around Gani-Kalve Copper Deposit, Kurnool District, A.P.* Osmania.

4. Raghavendra Rao, Makanboyina. *Some crop weather studies in Vizianagaram, Tirupati and Hyderabad in the pearl millet growing tracts of Andhra Pradesh.* Andhra.

5. Sesha Mani, Madhunapantula. *Some biometeorological studies of Andhra Pradesh.* Andhra.

6. Subrahmanya Sarma, Konduri Gurnadha. *Nearshore dynamics along Visakhapatnam Coast.* Andhra.

Engineering & Technology

1. Asanare, Keshav Laxman. *Some studies in synchronous machine control.* Nagpur. Dr. Y.G. Paithankar, Department of Electrical Engineering, Nagpur.

2. Manjunath, D. L. *Treatment of sugar industry wastes using Upflow Anaerobic Sludge Blanket (UASB) process.* Roorkee.

3. [illegible], T. *Studies in Gas liquid agitated vessels.* [illegible]

4. [illegible]. *Analysis of connecting rod big-end bearing of an internal combustion engine.* Roorkee.

5. Rathnamaiah K Subba. *Investigation of parameters affecting mould and casting characteristics in Vacuum moulding process using AL-4% Cu alloy.* Roorkee.

6. Valsarajan, K.V. *Some numerical studies on the large deflection of clamped skew sandwich plates and applicability of Saint Venant's principle in sandwich elements.* Kerala. Dr. N. Ramachandra Rao, Prof., Department of Civil Engineering, College of Engineering, Trivandrum.

P.S.M. DEGREE COLLEGE

KANNAUJ

Wanted a lecturer in education in the scale Rs. 2200-4000 on ad-hoc basis till 27.1.1989 (Likely to continue) or till an appointee of U.P. Higher Education Service Commission joins.

The application should reach the college office latest by 07.8.88 and attend interview on 14th Aug., '88 in the college at 01 P.M. The prescribed application form alongwith prescribed qualification is available in the college office on payment of Rs. 21.00.

Dr. P. N. Tandon
SECRETARY

CLASSIFIED ADVERTISEMENTS

UNIVERSITY OF KERALA
UNIVERSITY BUILDINGS
TRIVANDRUM

No. PR. 1201/25/88. **Dated : 15th July, 1988**

NOTIFICATION

Applications are invited from qualified candidates for appointment to the following posts in the University :

Sl. No.	Name of Post	Department	No. of Posts	Scale of Pay	Remarks
1.	Professor	Politics	1	Rs. 2450-3600	Open Merit Quota
2.	Professor	Education	1	-do-	do.
3.	Professor	Sanskrit	1	-do-	Reserved for Ezhava Community
4.	Reader	Aquatic Biology and Fisheries	1	Rs. 1950-2950	Non-Plan Open Merit Quota
5.	Reader	Phyces	1	-do-	Reserved for Muslim Community
6.	Reader	Botany	1	-do-	*Reserved for Ezhava Community*
7.	Reader	Mathematics	1	-do-	Open Merit Quota
8.	Reader	Politics	1	-do-	do.
9.	Reader	Education	1	-do-	do.
10.	Reader	English	1	-do-	Reserved for SC ST
11.	Lecturer	Aquatic Biology and Fisheries	2	Rs. 1300-2725	Non-Plan One post reserved for OBC; one in Open Merit
12.	Lecturer	Botany	1	-do-	Reserved for SC
13.	Lecturer	History	1	-do-	do.
14.	Lecturer	German	1	-do-	Reserved for Ezhava Community

Note : (1) Those who have requisite qualifications in Aquatic Biology, Zoology or Marine Biology *may apply for the posts in Department of Aquatic* Biology & Fisheries.

(2) In the absence of suitable candidates from the reserved community, applications from other reserved communities will be considered in accordance with the rules relating to communal rotation. In the absence of suitable candidates from any of the reserved communities, applications from forward community candidates will also be considered.

Requests for application form and further details regarding qualifications, age etc., accompanied by SBT challan receipt for Rs. 2/- (Rupees two only) remitted under K.U.F. Account, or crossed Postal Order for value of Rs. 2/- payable to the Finance Officer, University of Kerala, Trivandrum (in the case of candidates residing outside Kerala State only), should be addressed to the Deputy Registrar (Administration), University of Kerala, Trivandrum 695 034.

The last date for receipt of completed applications is 20th August, 1988.

REGISTRAR

ZAKIR HUSAIN POST-GRADUATE EVENING COLLEGE

AJMERI GATE, DELHI - 110006

Applications are invited for the following posts :

1. Lecturer in History -1-Permanent
2. Lecturer in Philosophy -1-Leave Vacancy
3. Lecturer in English -1-Leave Vacancy

All posts carry Grade & allowances admissible under the University rules.

Qualifications

(a) Doctorate Degree or Research Work of equally high standard. (b) Good academic record with atleast second class (C in seven point scale) Master's Degree in subject concerned. *Having regard to the need for develop*ing inter-disciplinary programmes, Degree in (a) and (b) above may be in relevant subject. Provided that if the Selection Committee is of the view that research work of a candidates as evident either from his her thesis or from published work is not considered suitable, a person possessing good academic record (weightage being given to M. Phil equivalent degree research work of quality) may be appointed provided he.she has done research work for atleast two years or has practical experience in a research lab organisation on the condition that he she will have to obtain Doctor's Degree or give evidence of research of high standard within ten years of appointment failing which he;she will not be able to earn future increments until the aforesaid requirements are fulfilled.

Application Forms available with the Office between 4 and 7 p.m. Those asking for the forms by post should send a self-addressed stamped envelope of 11"x5" size.

Those called for interview from outstations be paid single-one-way Railway fare on production of cancelled tickets.

Applications should reach the College Office within 15 days of the appearance of this advertisement.

SAHA INSTITUTE OF NUCLEAR PHYSICS

SECTOR-1, BLOCK 'AF',
BIDHANNAGAR
CALCUTTA-700 064

Advt No. SINP/R/2.88

Admission Notice (1988-89)

for Associateship Course in Radiological Physics

Applications are invited for admission to one-year Post M. Sc. Associateship Course in Radiological Physics leading to the Associateship Diploma of the Saha Institute of Nuclear Physics, Calcutta. Candidates should have an M.Sc. or equivalent degree in Physics or in Chemistry with specialization in Physical Chemistry from a recognized University.

Candidates appearing in the M. Sc. final examination in the subjects as mentioned above may also apply for admission.

Admission will be on the basis of academic records upto M. Sc. and of performance in an interview.

Candidates appearing for the interview will be reimbursed second class Railway fare for to-and-fro journey from their normal place of residence in India to Howrah/Sealdah Railway Station and back by the shortest route on production of Railway Receipts/Tickets and will also be paid D.A. for one day only as per rules of the Institute. Each student will be paid a scholarship of Rs. 1800.00 per month for the duration of the course. Hostel accommodation will be available for male students only. The session is likely to commence from September, 1988.

Applications in triplicate giving the full details of academic records should reach the undersigned by **August 8, 1988**.

D.N. Bhattacharjee
REGISTRAR

GURU NANAK DEV UNIVERSITY

AMRITSAR

CORRIGENDUM

The grades mentioned against serial Nos. 5, 15 and 37 (i.e. Rs. 1500-2500, Rs. 1200-1900 and Rs. 700-1600) in Advertisement No. 4/88 of the Guru Nanak Dev University may be treated as deleted and the same have been revised on the U.G.C. pattern (i.e. Rs. 4500-7500, Rs. 3700-5700 and Rs. 2200-4000 respectively).

REGISTRAR

ANNA UNIVERSITY
MADRAS 600 025

Advertisement No. 782/L3/88-2

Applications in the prescribed form are invited for the following posts in this University. Application form, details of prescribed qualifications and other particulars can be had from the Registrar, Anna University, Madras 600 025 on application, accompanied by a crossed Indian Postal Order for Rs. 10/- (Rupees Ten only) dated not *earlier than 20.7.88 drawn in favour of* the Registrar, together with a stamped self-addressed envelope (Rs. 2.00) of size 22 x 10 cm.

DETAILS OF POSTS

Division of Mining Engineering

Assistant Professor — (1)

(Scale of Pay : Rs. 1200-50-1300-60-1900)

Lecturer — (1)

(Scale of Pay : Rs. 700-40-1100-50-1600)

In addition, D.A., H.R.A. and C.C.A. are admissible at the rates in force from time to time.

Request for application forms, details of qualifications, field of specialisation prescribed and other particulars will be entertained upto **8.8.88**.

Last date for receipt of completed application is **12.8.88**.

Note : The candidates will be eligible for UGC/AICTE Scale when the revision is made.

REGISTRAR

TATA INSTITUTE OF SOCIAL SCIENCES

DEONAR

BOMBAY 400 088

Dated : 19.7.1988

Applications are invited for the following posts. The prescribed application form, along with the details of qualifications, experience, etc., prescribed for the posts, should be obtained either in person or by post, by sending an application for the same to the above address along with a stamped (Rs. 2.00) self-addressed envelope superscribed "Request for Application Form for Teaching Posts".

I. Professor : (One post) in the Research Unit for Research and Consultancy in Social Policy and Social Welfare Administration, in the pay-scale of Rs. 4500-7300+D.A. and other allowances. Substantive areas : **Social Work** (with special interest in Social Welfare Administration or Rural Development), **Sociology or Political Science.**

II. Reader : (Four posts) in the pay scale of Rs. 3700-125-4700-150-5300+D.A. and other allowances. **One post in the Department of Social Welfare Administration**, having M.A. degree *(with 55% marks) in Social Work with* either a specialisation in Social Welfare Administration or in a generic programme with field work or work experience in teaching administration or as an administrator or M.A. degree in Rural Management, and five years' administrative experience in Social Welfare/Development Administration; **One post in the Department of Research Methodology** having M.A. degree (with 55% marks) in Social Work, Social Sciences, or Philosophy and a Ph. D. Degree. **One post in the Research Unit for Research and Consultancy in Social Policy and Social Welfare Administration** having M.A. degree (with 55% marks) in Social Work, with either a specialisation in Rural Development or a generic programme with field work or work/research experience in Rural Development; Political Science or Public Administration (with Development Administration); **One post in the Research Unit for Sociology of Education**, having M.A. degree (with 55% marks) in **Sociology** or **Economics** or **Social Work.**

III. Lecturer (Six posts) in the pay scale of Rs. 2200-75-2800-100-4000+D.A. and other allowances. **Tow posts in the Unit for Rural Studies**, (1) having M.A. degree (with 55% marks) in Economics, Statistics/Econometrics, or Demography and (2) having M.A. degree in Social Work Anthropology, or Rural Development. The Second post is reserved for ST candidates; **One post in the Department of Urban and Rural Community Development**, having M.A. degree (with 55% marks) in Social Work with either specialisation in URCD or in a generic programme with field work or work experience in this field. **The post is reserved for ST candidates only; One post in the Research Unit for Social Policy and Social Welfare Administration**, having M.A. degree (with 55% marks) in Social Work

With either a specialisation in Social Welfare Administration or in a generic programme with field work or work/research experience in Rural Development; Economics (Welfare Economics and Agricultural and Rural Economics) or Anthropology. The post is reserved for SC candidates; One post in the Research Unit for Child and Youth Research having M.A. degree (with 55% marks) in Economics or Psychology and preferably with research related to Children and Youth. The post is reserved for SC candidates; One post in the Research Unit for Urban Studies, having M.A. degree (with 55% marks) in Economics, Human Geography or Public Administration. The post is reserved for SC candidates only.

IV. Assistant Librarian (One post) in the pay scale of Rs. 700-40-1100-50-1600 (unrevised) : D.A. and other allowances, having at least (a) a high Second Class Master's degree in a subject other than Library Science and Second Class in Bachelor's degree; (b) Master's degree in Library Science with first class or high second class.

V. System Incharge (One post in the pay-scale of Rs. 1100-50-1600 (unrevised), having Master's level degree (with 55% of marks) in Social Sciences/Mathematics/Statistics/Business Administration with about 5 years experience in handling Social Science research data analysis.

VI. Programmer (One post) in the pay-scale of Rs. 700-40-1100-50-1600 (unrevised) having Master's level degree (with 55% marks) in Social Sciences/Mathematics/Statistics/Business Administration with 2 years' experience in programming for Social Sciences research data analysis/Library documentation.

The last date for receipt of filled in application is **22.08.1988.**

N. Krishnamoorthy
REGISTRAR

BANASTHALI VIDYAPITH

The Vidyapith invites applications for the post of LIBRARIAN :

Qualifications : (a) I II M.Lib.Sc. or M.A./M.Sc./M.Com. with I/II B.Lib.Sc. or Diploma Lib.Sc.

(b) Minimum 10 years experience in responsible professional capacity in a University Library.

(c) Ph.D./Equivalent research work in the relevant field.

Grade : 4500-150-5700-200-7300.

Dearness Allowance, Contributory Provident Fund, Gratuity-cum-Insurance as per Vidyapith rules. Residential accommodation at subsidized rates.

Workers must become habitual wearer of KHADI on appointment.

Note : Persons who applied in response to advertisement No. 4 88 need not apply again.

Bio-Data on plain paper may be sent to the Secretary, Banasthali Vidyapith, P.O. Banasthali Vidyapith, Rajasthan 304022 within 15 days of the publication. No. 8 88.

INDIAN COUNCIL OF MEDICAL RESEARCH

Applications are invited upto **15th September, 1988** for the post *of Director* at Council's Regional Medical Research Centre, Jabalpur.

This Centre is engaged to improve the health status of the tribal population in the region, specially in Madhya Pradesh. The Centre carries out various studies using multi-disciplinary approach to find suitable solutions to health problems. The research emphasis is on utilizing various approaches for improving the health care delivery system such as epidemiological and *operational* research, control of vector-borne diseases, improving of the health of the mother and children as well as utilizing inter-sectoral approach for strengthening health *programmes*, genetic and entomological aspects of health and diseases and other common infectious diseases. The Centre is also engaged in doing socio-cultural and *anthropological* types of studies. The major research emphasis proposed for this Centre during VIII Five Year Plan will be on (i) *Control of* Vector Borne Diseases, specially Malaria and (ii) various aspects of Genetic Disorders. The Centre is well equipped with Genetic, Entomological and Microbiological laboratories at present, including Computer facilities.

Qualifications & Experience : Essential : MBBS with *doctorate* degree in Medical Sciences, e.g. Community Medicine/Paediatrics/Microbiology/Pathology or any clinical or laboratory allied subjects with research experience of 15 *years with original* work as evidenced by publications.

Desirable : Administrative experience in responsible position.

Job Requirements : The Director is expected to formulate and conduct research programmes requiring multidisciplinary approach for finding solutions to health problems with special reference to tribal population and regional specific health problems.

Salary Conditions of Service : The scale of pay attached to the post is Rs 5900-200-6700 plus allowances as per Central Govt. Rules and N.P.A. of Rs. 900 - p.m. for medical graduates only. Higher initial pay can also be considered. Medical aid and leave travel concession are also permissible for the employee and his family as per Govt. rules.

Age : Below 50 years. SC ST candidates allowed relaxation in accordance with Govt. of India Rules.

Benefits of pension admissible. Private practice is not allowed. However, non-practising allowance is admissible to medical graduates only as per rules of the Council.

Application forms can be obtained from the office of the Director General, Indian Council of Medical Research, Post Box No. 4508, Ansari Nagar, New Delhi-110 029. Applications complete in all respect should be sent to the Director General, Indian Council of Medical Research, Ansari Nagar, Post Box No 4508, New Delhi-110 029. Applications should be accompanied with crossed postal order for Rs. 8/- (No fee for SC ST candidates) made out in the name of Indian Council of Medical Research, New Delhi. Applications without postal order will not be entertained.

Candidates called for personal discussion will be paid 1st class rail fare by the shortest route. No TA DA is admissible for joining the post or on termination of appointment. Application from the employees working under the Central/State Govt. Semi Govt. and Govt. controlled undertakings should be sent through the employers and be received before the closing date alongwith the certificate that the applicant will be relieved within three months of receipt of appointment orders. Advance copies will be considered subject to the proviso that no objection certificate will be produced at the time of personal discussion. Applications received after the closing date will not be considered.

Incomplete applications will not be entertained.

S.V.E. Society's

RURAL ENGINEERING COLLEGE

BHALKI-585328

DIST. BIDAR (KARNATAKA)

Application on plain paper giving detailed bio-data are invited for Teaching Assisantss Local Candidates/Lecturers, Assistant Professors and Professors, in the Departments of :

A. Under-Graduate

Civil, Mechanical, Electrical, Electronics & Communication, Computer Science, Industrial & Production, Applied Mathematics, Computer Oriented Mathematics, Physics, Chemistry, Architecture and Town Planning, Engineering Economics and Accountancy.

B. Post-Graduate

Irrigation Engineering & Geotechnical Engineering, under Civil Engineering Department.

The qualifications and Pay Scales are as follows

1. Teaching Assistants Local Candidates

Qualifications 1st Class B.E. in case of Engineering graduate.

1st Class M. Sc. in case of applied Sciences

Pay Scales : Rs. 1890 - Consolidated.

2. Lecturers (Category 'A')

Qualifications 1st Class B.E. with distinction in Engineering with one year teaching experience.

1st Class M.Sc. with distinction in Applied Sciences with one year teaching experience.

Pay Scales : Rs. 1900-50-2300-75-2900-90-3350-100-3650.

Total emoluments at the minimum of the scale is Rs. 2082 - & at the maximum of the scale is Rs. 3930 - approximately.

3. Lecturers (Category 'B')

Qualifications : 1st Class M.E. in case of Engineering and Ph. D. in case of Applied Sciences.

Pay Scales : Rs. 700-40-1100-50-1600/ with a minimum starting basic of Rs. 860/-

Total emoluments at the minimum of the basic Rs. 2443/- & at the maximum of the basic Rs. 3747/- approximately.

4. Asstt. Professors

Qualifications : 1st Class M.E. with five years experience or Ph. D. with 3 years experience in case of Engineering Graduates and Ph. D. with five years experience in case of applied science candidates.

Pay Scale : Rs. 1200-50-1300-60-1900.

Total emoluments at the minimum of the basic Rs. 3082 - and at the maximum of the basic Rs. 4298 - approximately.

5. Professors

Qualifications : 1st Class M.E. with 7 years experience Ph. D. with five years experience in case of Engineering graduates and Ph.D. with 7 years experience in case of applied sciences department.

Pay Scale : Rs. 1500-60-1800-100-2000-125 2-2500.

Total emoluments at the minimum of the basic Rs. 3582/- and at the maximum of the basic is Rs. 5408 - approximately.

Membership of the Professional bodies, experience in laboratory planning and experimental development, published work of high repute in National and International journals will be an additional asset. The qualifications can be reasonably relaxed in case of well experienced persons. In case of exceptionally well qualified & experienced candidates, salary can be negotiated.

The completed applications should reach the undersigned within fifteen days of the publishing of this advertisement alongwith a crossed Indian Postal Order D.D. for Rs. 10 - drawn in favour of Principal, Rural Engineering College, Bhalki. The Candidates should take no objection from their employees at their end as they will have to join the new post in case of selection reasonably at the earliest.

Bhimanna Khandre
M.L.C.
CHAIRMAN

Dr. S.M. Goel
PRINCIPAL

MAULANA AZAD COLLEGE OF TECHNOLOGY

(A REGIONAL ENGINEERING COLLEGE)

BHOPAL (M.P.)

Advertisement No : Estt/R/2/7/88

Applications are invited for the following posts in the prescribed forms.

A. Professor Architecture and Chemistry

Scale of Pay : Rs. 1500-60-1800-100-2000-125/2-2500 (to be revised)

Age : Not below 35 years

A (i) Essential qualifications—Architecture

An eminent scholar with published work of high quality, actively engaged in research. Ten years of experience in teaching research professional work. Experience of guiding research.

OR

An outstanding architect with established reputation who has made significant contribution to knowledge.

A (ii) Essential qualifications—Chemistry

An eminent scholar with published work of high quality, actively engaged in research. Ten years experience of teaching and or research. Experience of guiding research at doctoral level.

OR

An outstanding scholar with established reputation who has made significant contribution to knowledge.

Specialisation : In any branch of Chemistry.

B. Asstt. Professor—Civil, Mechanical & Mathematics

Scale of Pay : Rs. 1200-50-1300-60-1900 (to be revised)

Age : Not below 30 years

B (i) Essential qualifications for Civil & Mechanical Engg.

Good academic record with a Doctor's degree in relevant field. About five years experience of teaching and/or research and development.

Candidates not possessing Ph. D. may be considered, if they have to their credit equivalent research published work or design/development work of a high order either in the institution or in an industry.

OR

In case of persons to be recruited from industry or professional fields, candidate should possess good academic record with recognised professional work of about seven years which should include innovation and or research and development.

Specialisation

For Civil Engineering : Hydraulics and Fluid Mechanics, Building Science & Technology, Structural Engineering Applied Geology Transportation Engineering Surveying.

For Mechanical Engineering : Machine Design Vibration Tribology Head Power Production Industrial Engineering/Fracture Mechanics Operation Research.

B (ii) Essential qualifications for Mathematics

Good academic record with a doctoral degree or equivalent published work. Evidence of being actively engaged in (i) research or (ii) innovation in teaching methods or (iii) production of teaching materials. About five years experience of teaching and or research provided that atleast three of these *years were as Lecturer or in a equivalent position. This condition may be relaxed in the case of candidates with outstanding research work.*

Specialisation

Elasticity including thermo elasticity *or* Numerical analysis and statistics *Or* Special functions and Computer Programming, *Fourier series, Hydrodynamics and* **Magneto** *Hydrodynamics.*

C. Lecturer Mathematics

Scale of Pay : Rs. 700-40-1100-50-1600 (to be revised)

Age : Not below 22 years

Essential qualifications

(i) A doctorate degree or research work of an equally high standard; and

(ii) Good academic record with atleast second Class (C in the seven point scale) Master's degree in a relevant subject from an Indian University or an equivalent degree from foreign University.

Having regard to the need for developing inter disciplinary programmes, the degree in (i) and (ii) above may be in Mathematics.

Provided that if the selection committee is of the view that *the research* work of a *candidate as evident either from his thesis or from his published* work is *of very high* standard, it may relax any of qualifications prescribed in (ii) above.

Provided further that if a candidate possessing a Doctor's degree or equivalent research work is not available or is not considered suitable, a person possessing a good academic record (weightage being given to M. Phil or equivalent degree or research work of quality) may be appointed provided he has done research work, for atleast two years or has practical experience in a research laboratory organisation on the condition that he will have to obtain a Doctor's *degree or give evidence of research of high standard within eight years of his appointment*, failing which he will not be able to earn future increments until he fulfils these requirements.

Desirable : Knowledge of Numerical Analysis, Computer Programming, and Operational research.

General Instructions

1. Age relaxable in case of exceptionally outstanding candidates.

2. (a) Candidates serving in the Government Semi-Govt., Autonomous organisations should apply through *proper* channel or they should *produce* 'No Objection Certificate' from the employer at the time of interview, if called.

   (b) Those who had applied on *prescribed* application form and through proper channel in response to advertisement No : *Estt R 1 June 86 (For the* posts of *Prof.* Chemistry/Asstt. Prof. Mathematics Lecturer Mathematics) may send their applications on plain paper mentioning further achievements, if any.

3. Higher initial pay may be considered in deserving cases.

4. The benefit of CPF-cum-Gratuity is admissible according to College rules.

5. The Scheme for CPF-cum-Pension-cum-Gratuity is likely to be implemented.

6. Adequate number of seats are reserved for SC ST candidates. Other things being equal, preference will be given to candidates belonging to SC ST

7. Application form can be had from the Registrar, Maulana Azad College of Technology, Bhopal-462 007 on requisition accompanied by self addressed and Rs. 2.20 paise stamped envelope 25x10 cm size giving on the top of the cover *name of the post and advertisement* number Estt R 2 July, 1988.

8. Completed applications should reach the Registrar at the above address on or before **16th August, 1988.** Incomplete late applications and those without registration fee of Rs. 7.50 in the form of Crossed Indian Postal Order may not be considered.

Further details will be made available in the instructions sheet attached with the prescribed application form.

REGISTRAR

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